677
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TEXTILE MANUFACTURER

Monthly: Two Shillings and Sixpence ESTABLISHED 1875 MAY 1958

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JUN 2 1958

Some people with long memories are saying that business is not what it was. Well of course it isn't. For that matter nothing is ever quite what it was. Conditions change. Times change. We change. The only thing that doesn't change is that little bit of grit and gusto in our nature that tells us to snap out of the doldrums and show our competitors and customers just what we can do. It's surprising, when you really go all out to meet the demand for something, what a demand you meet.

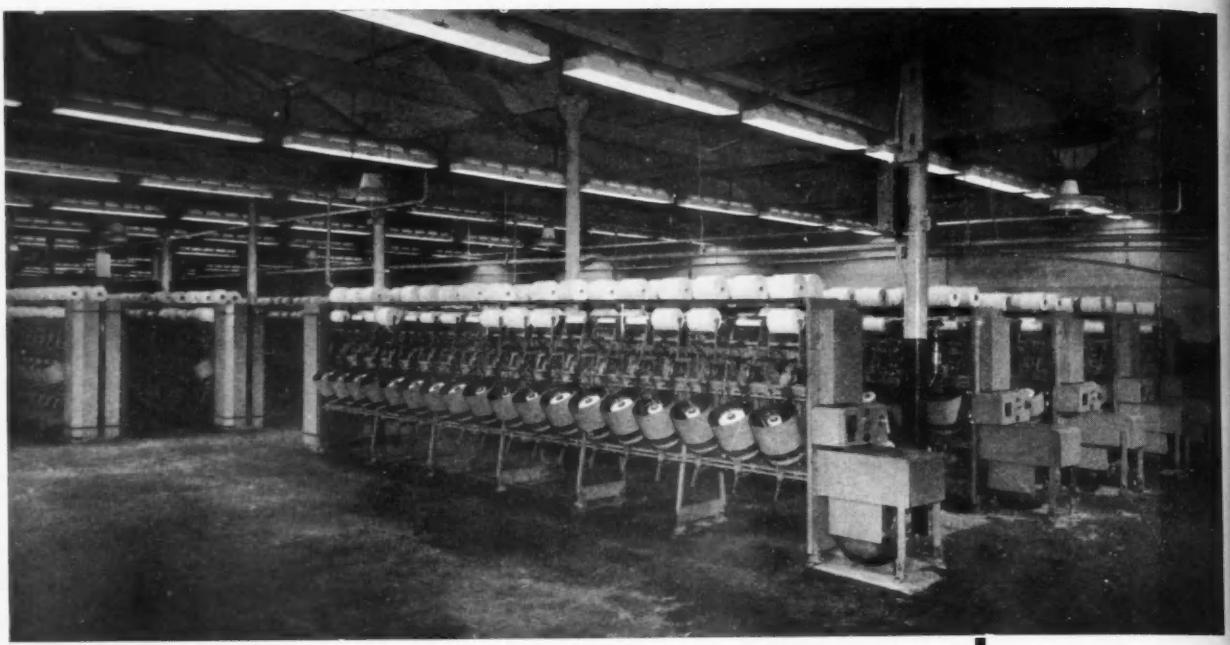
Bleachers' Association are ever ready to help you when it comes to the finishing. They have a great deal of experience, almost unlimited resources, and a research team in the vanguard of those new technical developments whose application can help to sell your fabrics in today's highly competitive markets.

BLEACHING · DYEING · MERCERISING · FINISHING · PRINTING

Enquiries to Commercial Department.

BLEACHERS' ASSOCIATION LTD.

BLACKFRIARS HOUSE MANCHESTER 3



Photographs by courtesy of SPUR DOUBLING CO. LTD., Reddish, nr. Stockport

The Westmorland DOUBLER

PRODUCES FOR **JOHN CROSSLEY & SONS LTD.**

THROUGH THEIR ASSOCIATED COMPANY

MESSRS. SPUR DOUBLING CO. LTD.

Carpet Yarns

ON CONE OR CHEESE

The Westmorland Doubler is particularly suitable for processing Tufted Carpet Yarns being fed by multiple end wound packages normally 8″ × 8″ on 1½″ bore tubes, but a 10″ traverse × 8″ diameter package can be applied if desired.

This means a completely knotless package can be doffed in cone or cheese form, ready for the tufting machine. Maximum cone diameter 10″. Two turns for every revolution of the spindle are inserted, giving extremely high production, viz.: 3 fold/3s counts, inserting 3 T.P.I.

Approximate production per 44 hours from 36 spindle machine—6,000 lbs.

The Westmorland Doubler is manufactured under agreement by

S. DODD & SONS LTD.

LYON WORKS OLDHAM

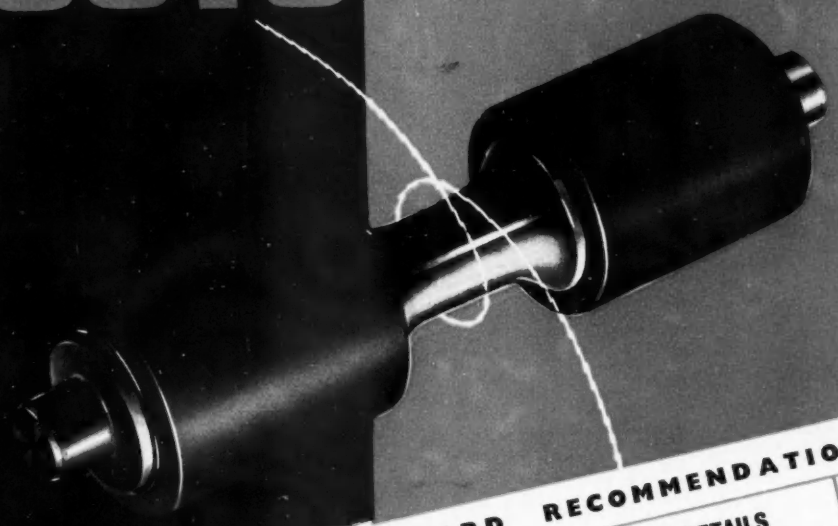
Telephone: MAln (Oldham) 3617

DODD

TEXTILE MACHINERY

GACOTS

TEXTILE ROLLER COVERINGS



Cut Spinning Costs

STANDARD RECOMMENDATIONS

APPLICATION	YARN DETAILS	GRADE
Comber Detaching ...	—	CA 74
Comber Drawbox ...	—	CA 78
Drawframe	Cotton	CA 78
Drawframe	Fibro	CR 85
Sliver Lap	—	CA 78
Ribbon Lap	—	CA 78
Slubbing	—	CR 85
Intermediate	—	CR 85
Roving	—	CR 85
Jack	—	CR 85
High Draft Speed Frames	Counts up to 70's	CR 85
Ring	Counts over 50's	CR 75
Ring	—	CR 65
No Traverse Ring ...	—	CS 72
Balmes Ring	—	CR 75
Fine Spinning Mules ...	—	CR 75
Oldham Mules		CY 81

TECHNICAL SERVICE

Our staff of technical representatives are ready to visit your mill and make individual recommendations and provide follow-up assistance and advice.

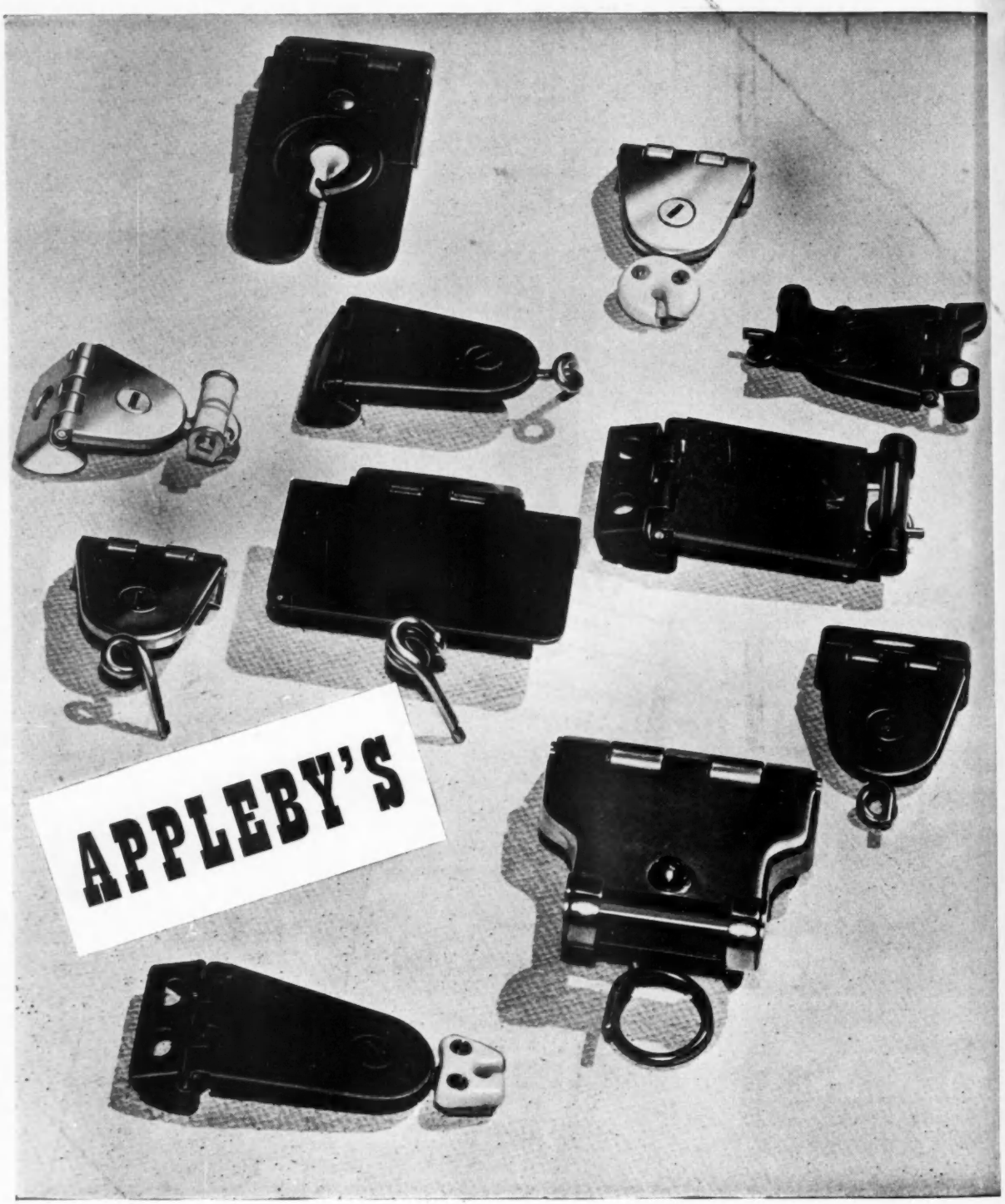
ROLLER COVERING SERVICE

Gacots can be supplied to users in the United Kingdom, mounted and ground ready for immediate use, by our official agents and roller coverers :—

CLEGG & MELLOR LTD
WERNETH LEATHER WORKS
OLDHAM, Lancs.
TELEPHONE - MAIN 4085

GEORGE ANGUS & Co LTD

OIL SEAL DIVISION, COAST ROAD, WALLSEND-ON-TYNE



for all types of lappets

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2 machines in one - direct positive beam drive

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REPRESENTATIVES FOR NORTHERN IRELAND & EIRE:

Mr. H. R. Holfeld, 17 Waterland Road, Stillorgan - Dublin

BY APPOINTMENT TO HER MAJESTY THE QUEEN MANUFACTURERS OF ELECTRIC LAMPS

WORKSHOP?

SHOWROOM?

THE ANSWER IN ONE 'NEW-RANGE'

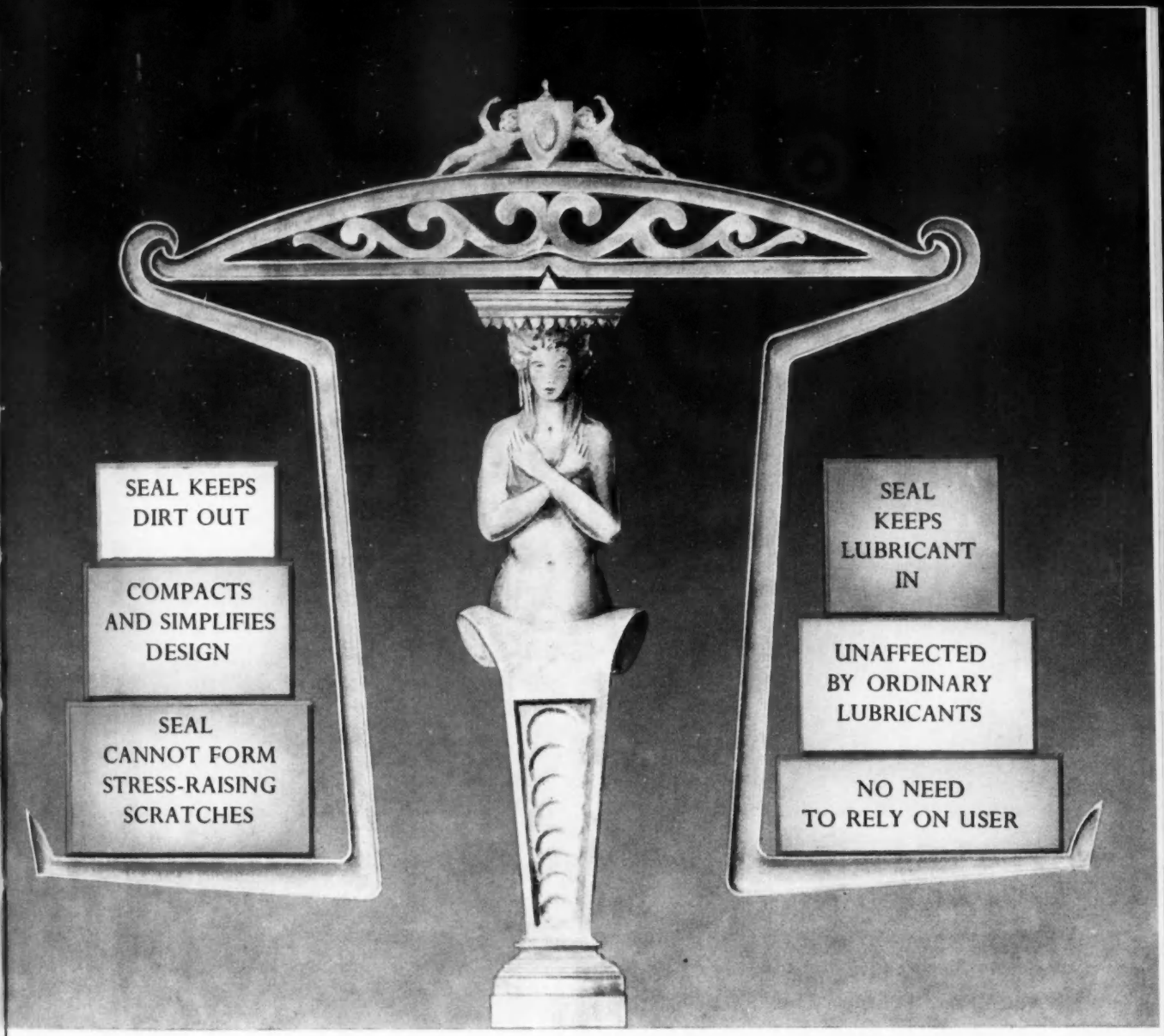
No other fluorescent fittings cover so many lighting applications. 'New-Range' parts are completely standardised and interchangeable allowing easy adaptation and quick maintenance. Several reduced prices reflect the wide acceptance of 'New-Range' by Government departments and by the largest buyers. New fast-installation features make possible further economies. All fixings for 'New-Range' are included in the pack.

CP ELECTRICAL EQUIPMENT

Crompton 'NEW-RANGE'

FLUORESCENT FITTINGS

Crompton Parkinson Ltd., Crompton House, Aldwych, London W.C.2.


SEAL KEEPS DIRT OUT
COMPACTS AND SIMPLIFIES DESIGN
SEAL CANNOT FORM STRESS-RAISING SCRATCHES
SEAL KEEPS LUBRICANT IN
UNAFFECTED BY ORDINARY LUBRICANTS
NO NEED TO RELY ON USER

WEIGHING THINGS UP

or keeping stuff out and keeping stuff in

It is difficult to give a casting vote—it's no good loading a bearing with enough lubricant for a long life, if the dirt can still get in.

Moreover it's no good just keeping the dirt out if the lubricant escapes and leaves the designer in a fool's paradise, with the bearings dry.

As we and many important users see it, the whole combination of advantages goes together.

The sealed bearings are exactly interchangeable with standard FBC and other bearings, and can be supplied with the seal on either one or both sides.

FBC

FBC FISCHER
(Regd. Trade Marks)

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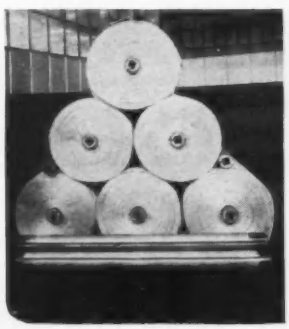
BALL AND PARALLEL-ROLLER BEARINGS

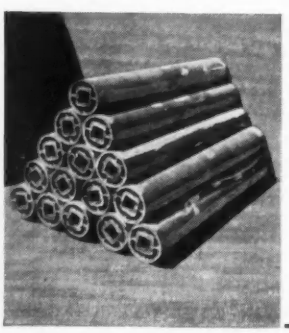
FISCHER BEARINGS CO. LTD., WOLVERHAMPTON

Fischer Bearings Company Ltd., and Timken-Fischer Stockists Ltd., Birmingham, are both subsidiaries of British Timken Ltd.

Beams, Beam Flanges, Batching Rollers and Shells are but a few of the applications in the Textile Trade to which aluminium alloy castings are today being adapted. William Mills Limited have a large and modern factory capable of producing all classes of Sand, Gravity die and Pressure die castings in aluminium, and these, in many instances, may show definite advantages over your other materials now in use. Enquiries regarding design and application of aluminium alloy castings will be welcomed by the Technical Sales Department.

Photos: courtesy of Messrs. John Bright & Bros. Ltd., Messrs. Harwood Cash & Co. Ltd., Messrs. Firestone Tyre & Rubber Co. Ltd.





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Specialists for Fifty Years in

ALUMINIUM ALLOY CASTINGS

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. . . to tell people who already know, about the uses of formaldehyde. But we have every reason to puff out our chest about our quality and delivery service. We — the *first* U.K. producers — offer quick delivery of highest standard water-white formaldehyde, in any quantity, anywhere. Our service is second to none, our quality consistently high. If you are interested, write for our booklet which gives specifications of Ashworth formaldehyde and other useful information on storage, handling, etc.

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Phone BURY 51 for ASHWORTH

Formaldehyde

Also paraformaldehyde and hexamine.

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WELSH HAT FERRULE

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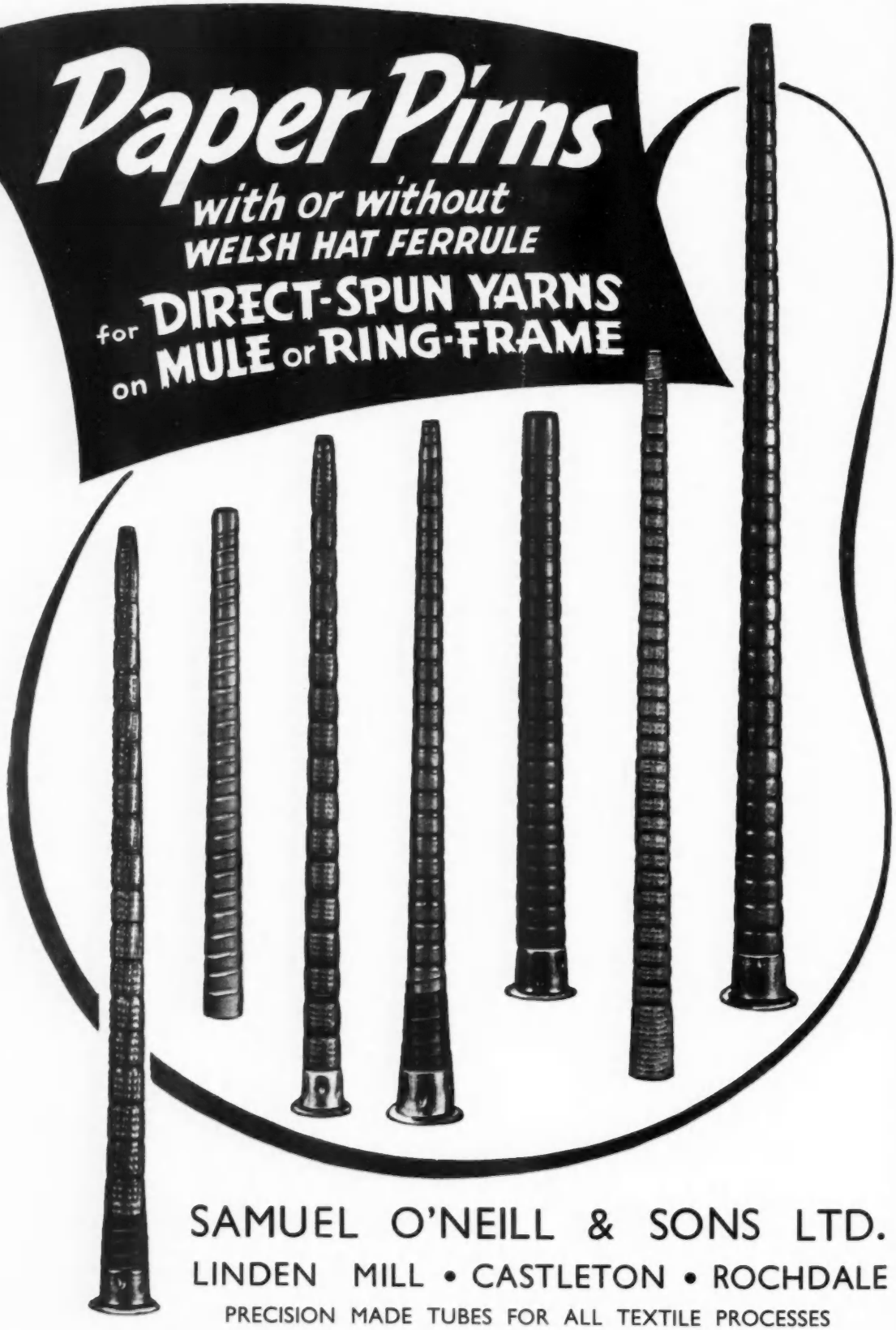
on MULE or RING-FRAME



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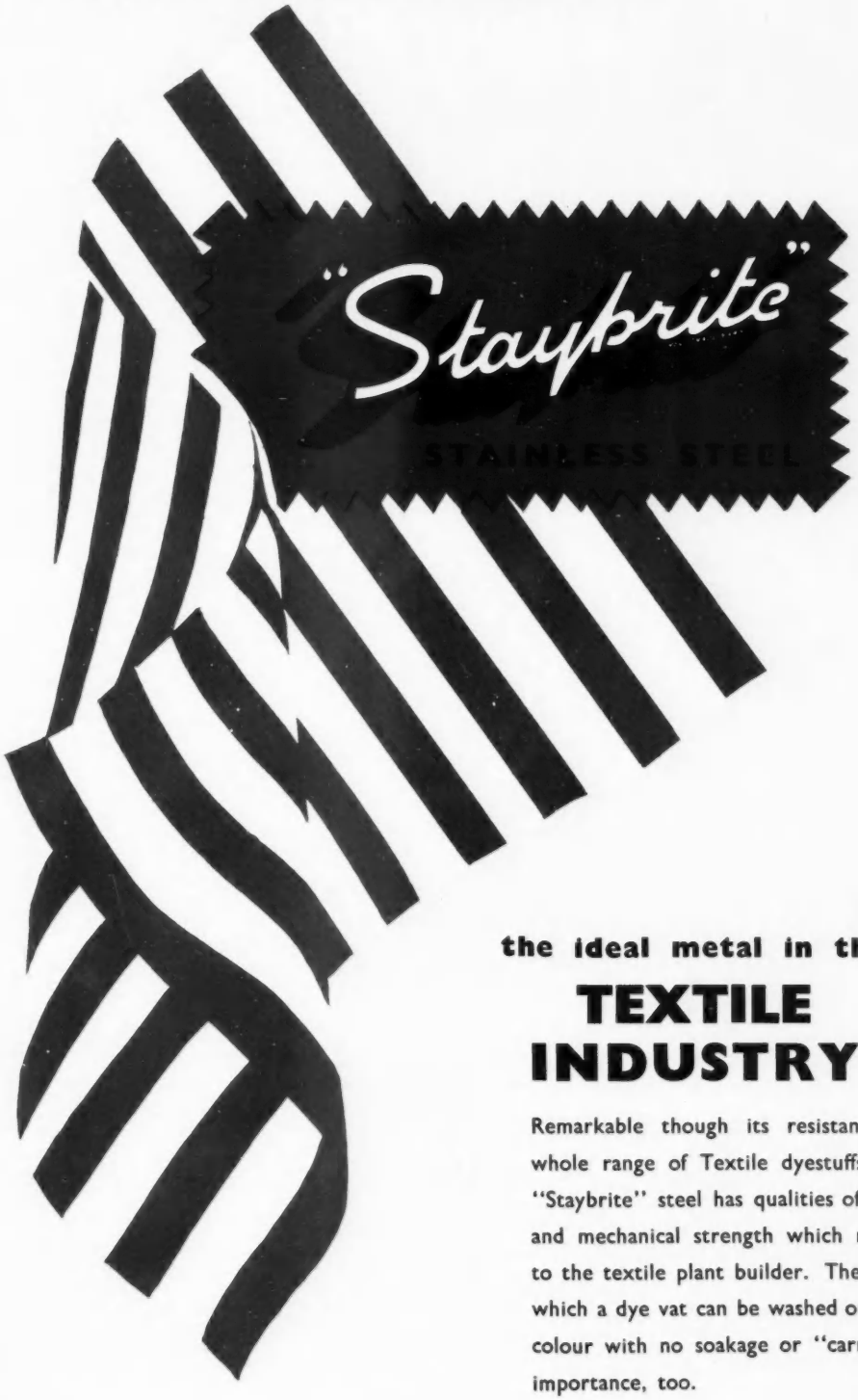
PRECISION MADE TUBES FOR ALL TEXTILE PROCESSES

Telegrams: O'NEILL, CASTLETON, ROCHDALE . . . .

Telephone: Castleton, (Rochdale) 57892 (3 lines)

For over 20 years supreme



the ideal metal in the

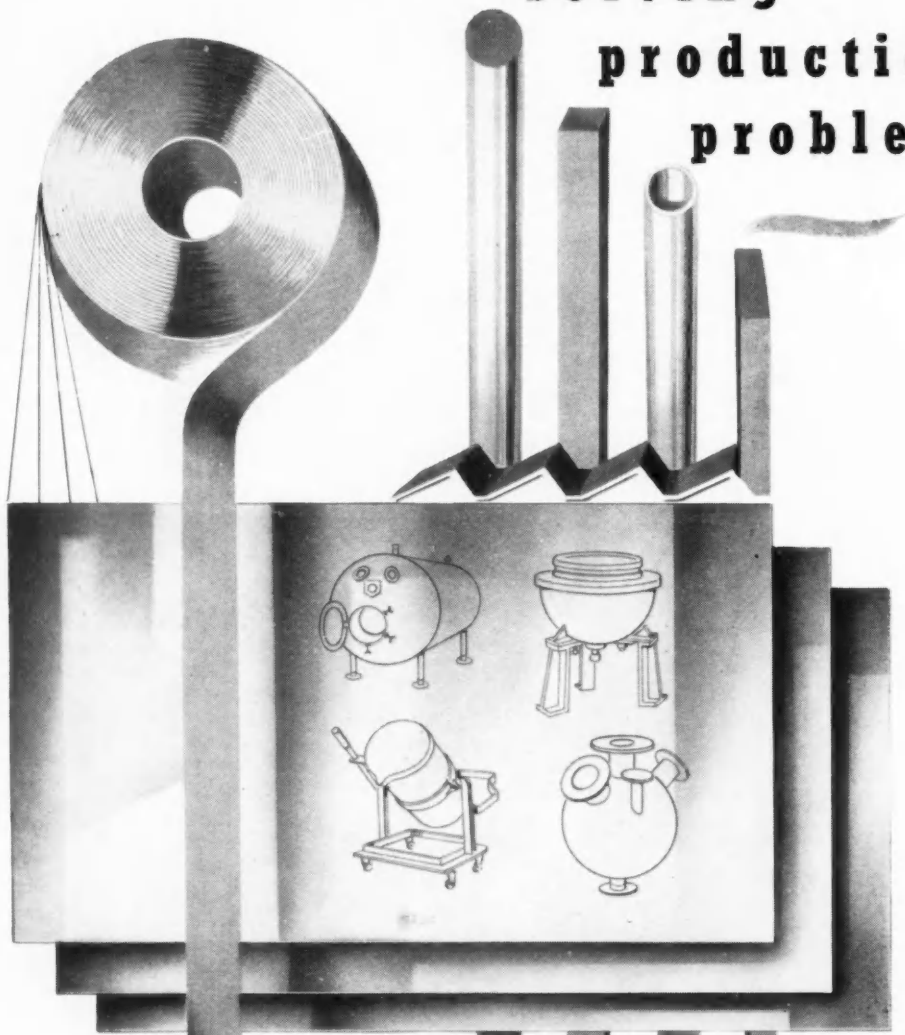
TEXTILE INDUSTRY

Remarkable though its resistance is to the whole range of Textile dyestuffs and liquors, "Staybrite" steel has qualities of superb finish and mechanical strength which recommend it to the textile plant builder. The rapidity with which a dye vat can be washed out for another colour with no soakage or "carry over" is of importance, too.

FIRTH-VICKERS STAINLESS STEELS LTD., SHEFFIELD

Tel: Sheffield 42051

solving production problems



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IN ALL FORMS AND FINISHES

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P&V STAINLESS STEEL

PADLEY & VENABLES LTD

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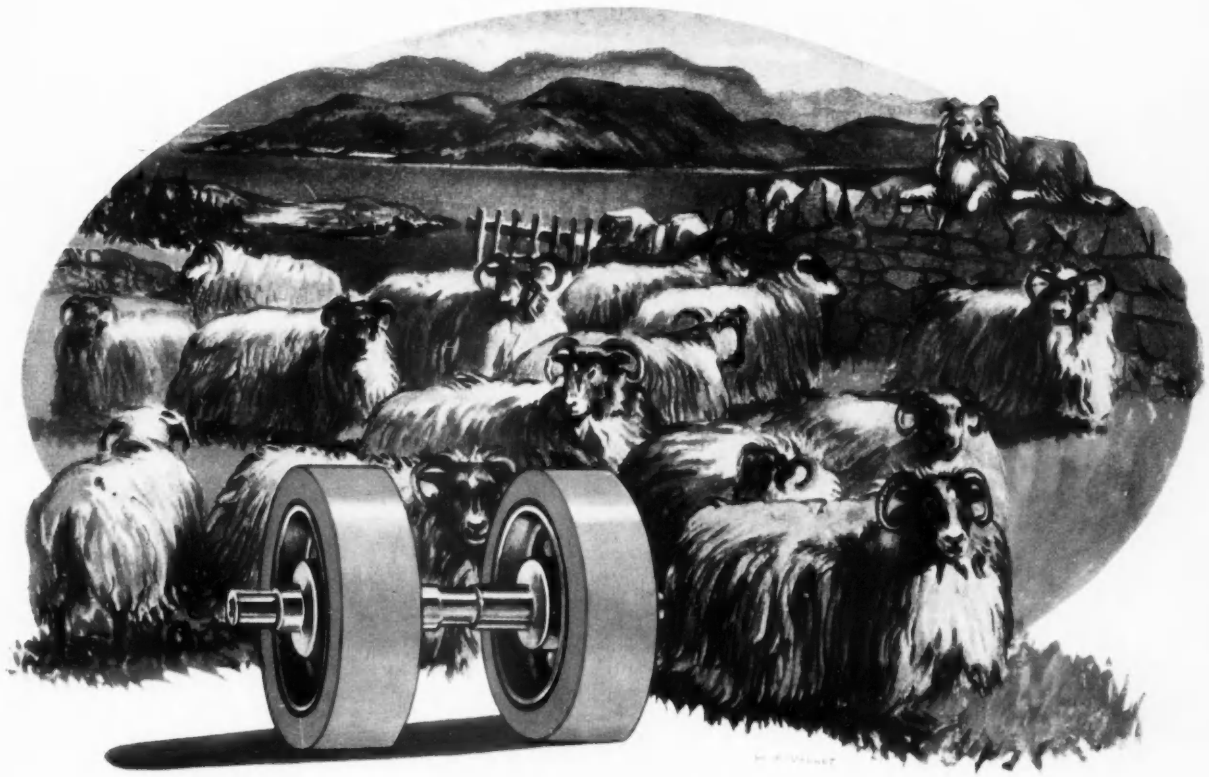
Dayco Worsted Cots

MADE IN SCOTLAND



Products of Pedigree - Lead the Field

Dayton Rubber Co. Ltd
Dayton Works Dundee

LANCASHIRE SALES DIVISION, SHEFFIELD ST., STOCKPORT. TEL 3464

NEW!

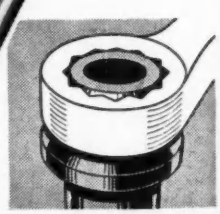
A 12 POINT RING BOLT FOR USE WITH RING SPANNERS

ANOTHER UNBRAKO CONTRIBUTION TO INDUSTRY . . . . . .

Unbrako, world leaders in the manufacture of internal wrenching bolts, make a new contribution to industry — an external, 12 point bolt specially designed for ring spanners, and with a host of applications.

Naturally, it's a fine precision job, subject to every Unbrako quality test, and it has many advantages over ordinary hex bolts. For example, the 12 point head gives double purchase, the wide, toughened shoulders give a greater and stronger bearing area.

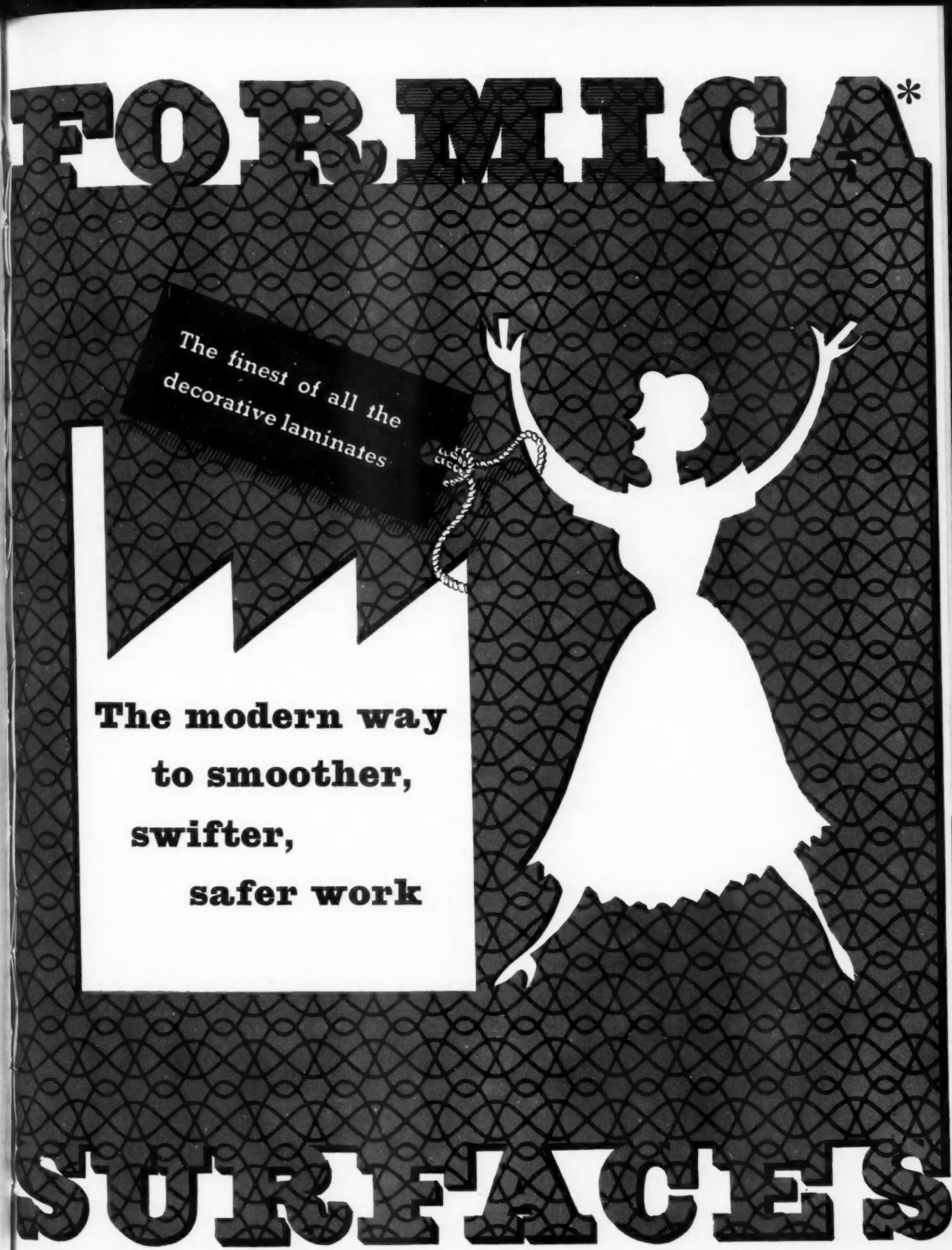
But most important of all, these new 12 point bolts are made by Unbrako — your basic assurance of quality and reliability. Details of sizes and threads will gladly be supplied on request.



See how a ring spanner grips the 12 point ring bolt while the greater bearing area ensures an even tighter joint.

UNBRAKO

UNBRAKO SOCKET SCREW CO LTD · COVENTRY


FORMICA*
The finest of all the decorative laminates
The modern way to smoother, swifter, safer work
SURFACES

▲ FORMICA surfaces for hygiene in canteens

... and as working surfaces in the quilting room ▼

Nothing so hard-wearing and practical as FORMICA surfaces—or more beautiful! They stand up to rough treatment, never split or crack . . . stay smooth and hard—cause no snagging. They are unaffected by water, chemicals or oils—even heat up to 310°F. They're clean at a wipe, so save work and money too. Expensive? No—and they virtually last for ever.

specify FORMICA* surfaces

In fact FORMICA surfaces are a good investment from any point of view. The original cost is not high and they wear much longer than other surfacing materials—to say nothing of the enormously increased saving in cleaning time and labour. They come in a wide range of delightful colours and patterns, too . . . which makes for versatility as well as colour and beauty in decorative schemes. FORMICA, the finest of all the decorative laminates.

Easy to get—and to fit.

Your maintenance staff will find no difficulty in fitting FORMICA panels and our technical service department will be happy to provide full advice for individual applications. For major schemes write to your FORMICA Area Office for full information.

Suggested applications in factories...

The Boardroom	Door facings
Workbenches	Store shelving
Office desks and fittings	Canteens (tables, side-tables, and wall-panelling)
Reception areas	Inspection tables
Partitionings	Laboratory benches
Switchboard panelling	First aid rooms

Delaron* Chair Sets (in colours to harmonise with FORMICA decorative laminates) are also ideal for use in factories... hardwearing, easy to clean. Write to your Area Manager for details.

FORMICA* decorative laminates

Area Offices

London	De La Rue House, 84/86 Regent Street, W.1 *Tel: Gerrard 6180*
North-West England	4 Albert Square, Manchester 2 *Tel: Blackfriars 3250*
North-East England	85/87 Cookridge Street, Leeds *Tel: Leeds 2-6489*
W. England & S. Wales	36 Corn Street, Bristol 1 *Tel: 27954*
Scotland	116 Hope Street, Glasgow C.2 *Tel: Central 3541*
West Midlands	6/7 Hockley Hill, Birmingham 18 *Tel: Northern 5540*
East Midlands	5 Gallowtree Gate, Leicester *Tel: Leicester 21816*

Area Representatives

Southern Counties	18 King's Park Road, Southampton *Tel: Southampton 27987/8*
East Anglia	De La Rue House, 84/86 Regent Street, London W.1 *Tel: Regent 2901*

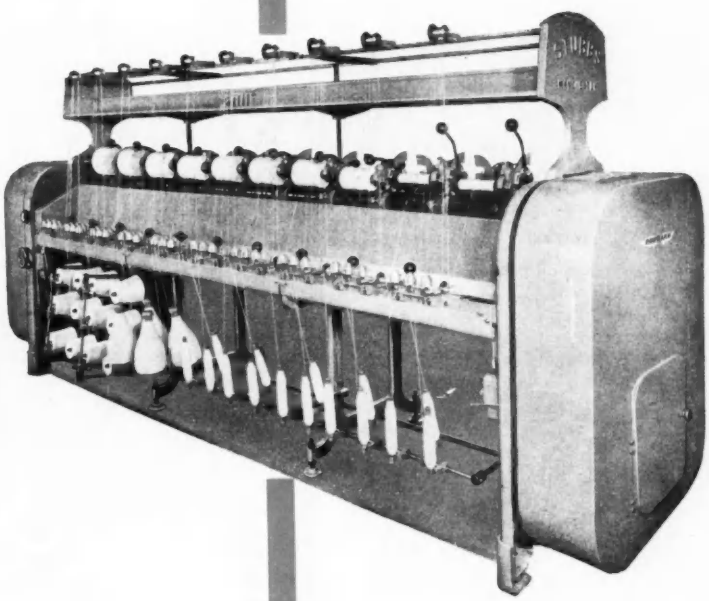
For any further information please write or telephone to:
Formica Ltd., Dept. F.736, De La Rue House,
84/86 Regent Street, W.1 *Tel: Regent 2901*

* Delaron and Formica are registered trademarks.

STUBBS DUBRAKE

MULTI-END CHEESE WINDER

(PATENT APPLIED FOR)



Perfect packages are wound at exceptionally high speeds and the Machine is most simple to operate and gives trouble-free running, thus keeping maintenance costs at an absolute minimum.

Instantaneous Stop Motion operates upon breakage or termination of a thread.

The dust extraction unit is fitted as an extra. Dust and fluff created during winding effectively drawn and carried to a collecting canister at the off end of the Machine.

Standard Machine supplied with direct 'V' Rope Drive from Motor to Driving Shaft.

If desired, a variable Speed Drive can be supplied with tachometers and hand wheel adjuster.

Winding Speeds up to 800 Yards Per Minute

Makers of Machinery for WINDING, DOUBLING, CLEARING, GASSING, REELING, PREPARING, POLISHING and BUNDLING all classes of Yarns and Threads.

Telephone: COLLYHURST 1721 (3 lines) Telegrams: WINDING, MANCHESTER

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ANCOATS · MANCHESTER 4

For better and higher drafting

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INCORPORATING
THE BEST PRINCIPLES—
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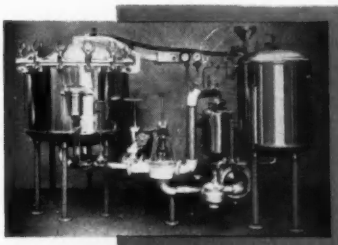
PEGG

PRESSURE DYEING MACHINES

A complete range of machines for dyeing all types of fibre in every stage of manufacture, including loose, top, beam, hank and package forms. Also rapid package drying machines.



HANK DYEING MACHINES

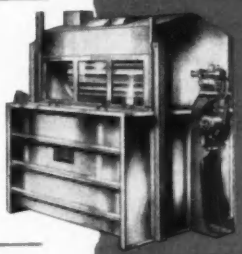
Built in stainless steel in capacities ranging from 25 to 1500 lbs. for all classes of wool, worsted, mixture and linen yarns in hank form. Machines may be coupled together.

LOOSE STOCK DYEING MACHINES

For all classes of loose stock, rags and synthetic fibres, in 3 capacities of 10–50 lbs., 100–250 lbs. and 200–600 lbs. Stainless steel construction.

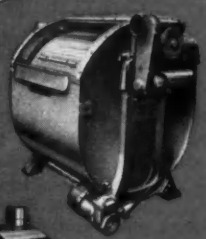
PIECE GOODS DYEING MACHINES

A comprehensive range of machines available in stainless steel for dyeing all types of woollen or worsted piece goods, silk or rayon fabrics and knitted fabrics in rope form. Also carpet dyeing machines.



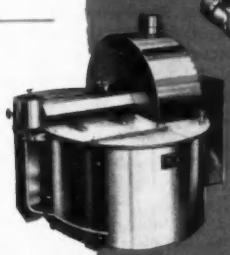
ROTARY DYEING MACHINES

Totally enclosed rotating drum machine for dyeing nylon, pure silk, rayon and cotton hose with perfect penetration and uniformity. Stainless steel in 25, 50, 100, and 200 lbs. capacities.



PADDLE DYEING MACHINES

A versatile machine, in stainless steel, for ladies' hose, half hose, and loose articles. Also used for anti-shrink and bleaching. 4 capacities from 12–200 lbs.



DYEING AND FINISHING MACHINES

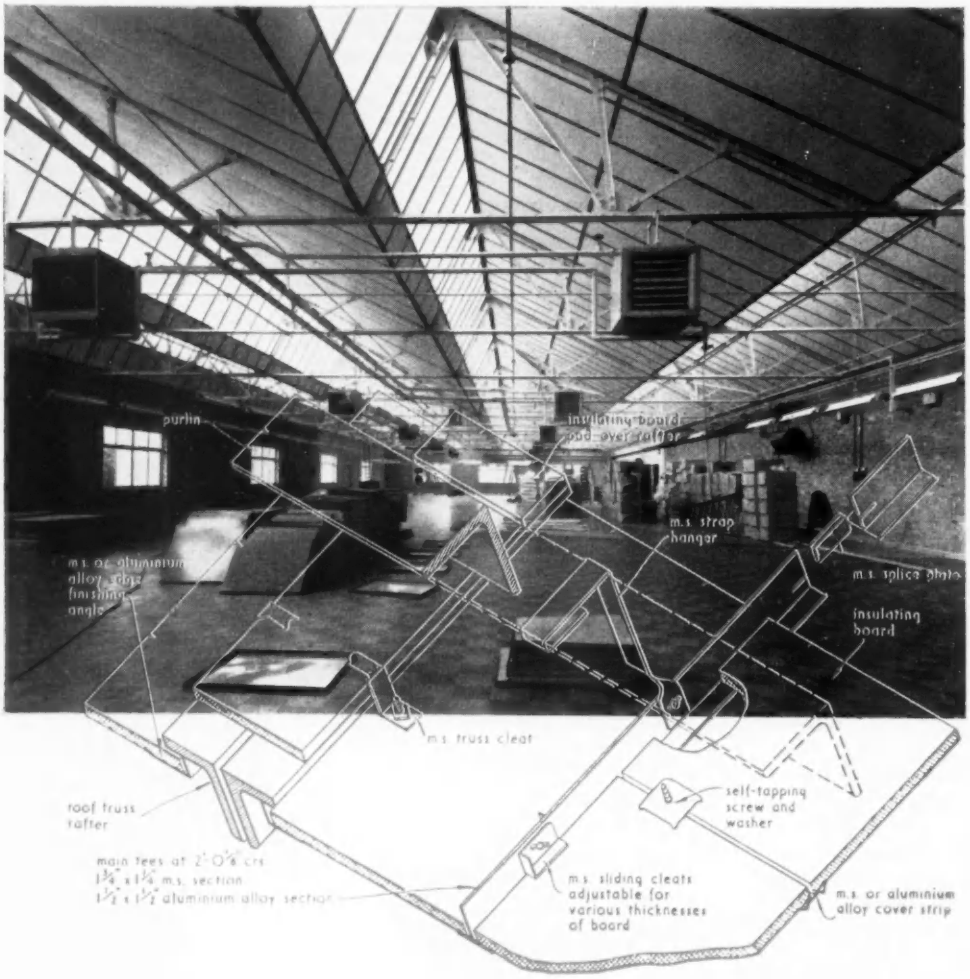
Builders of dyeing machines for loose stock, hanks, packages, piece-goods, fabric and hose; also finishing machines for all classes of circular knitted and warp loom fabrics and garments. Pre-boarding and finishing machines for nylon hose.

A Member of the Bentley Group

SAMUEL PEGG & SON LTD · **Barkby Rd** · **Leicester** · **England** Telephone: 66651 · Telegrams: 'PULSATOR'

SP.1

Thermal Insulation of Buildings


purlin
insulating board over rafter
m.s. strap hanger
m.s. or aluminium alloy edge finishing angle
m.s. splice plate
insulating board
m.s. truss cleat
roof truss rafter
self-tapping screw and washer
main tees at 2'-0⅛" crs
1⅜" x 1¼" m.s. section
1½" x 1½" aluminium alloy section
m.s. sliding cleats adjustable for various thicknesses of board
m.s. or aluminium alloy cover strip

The above illustration shows Heywood's under-purlin system of fixing, suitable for steel or aluminium alloy tee sections with wood pulp and asbestos insulation board, plasterboard etc., for the thermal insulation of buildings.

The system is applicable to flat or curved roofs and is ideal for suspended ceilings.

Glass - Silk, Aluminium foil or other blanket insulation material can be incorporated.

HEYWOODS
OF HUDDERSFIELD

Heat loss through roofs and walls of industrial buildings is heat wasted, — fuel wasted, — money wasted. Heywood's efficient Thermal Insulation of buildings KEEPS HEAT IN ITS PLACE and upwards of 50% reduction of heat loss is assured.

Installation in existing premises provides economy for the future. Planned in advance for new structures substantial reduction in capital expenditure for heating equipment can be realized, and resultant economies maintained.

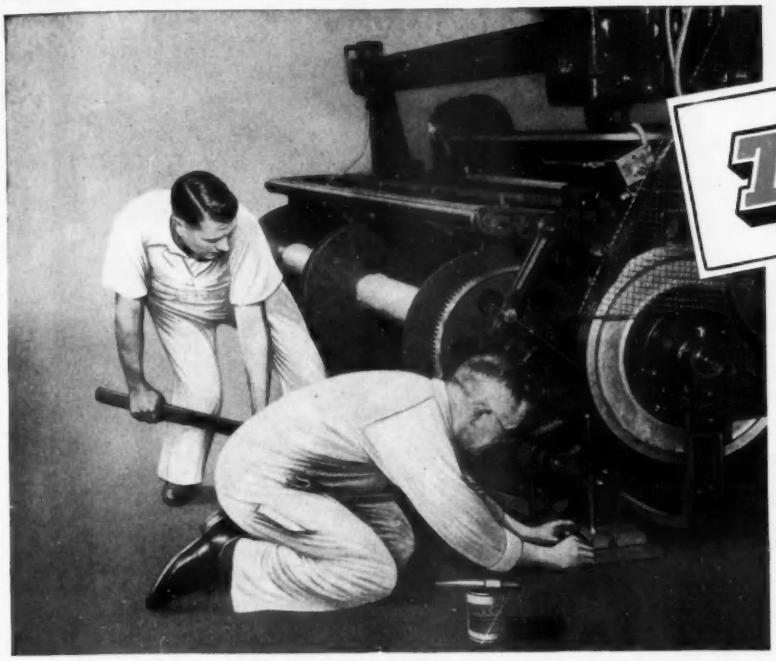
Information Sheets and further details gladly supplied. Please ref : Dept. SPEC/H.

Where appearance is of special importance, our system of concealed fixing provides a particularly attractive element with factual efficiency.

W. H. HEYWOOD & CO. LTD., HUDDERSFIELD. Tel. 6594 (5 lines)

Branches at: London, Manchester, Glasgow, Belfast, Newcastle, Birmingham, Liverpool, Leicester, Nottingham, Bristol, Associate Company in Eire: W. H. Heywood & Co. (Ireland) Ltd. 63-64 Upper O'Connell Street, Dublin.

ARE YOUR TROUBLES MOUNTING?



LET

TICO

PADS SOLVE THEM FOR YOU

NO BOLTS REQUIRED

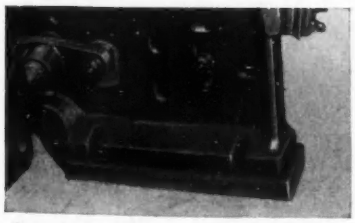
EASY TO MOVE

IDEAL FOR UNEVEN SURFACES

Suitable for any type of floor

Your only regret will be that you have not used them before !

Shown above : Ultra-modern weaving shed where TICO Anti-vibration Pads are installed under every loom. (Photograph by courtesy of the British Rayon Research Association).



Close up 3-yard Loom mounted on block type TICO PADS.

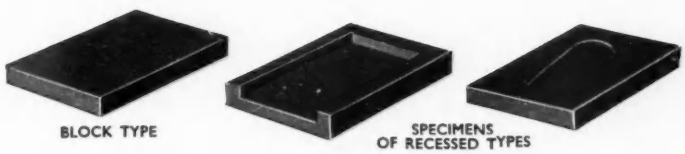
NO FUSS! NO BOTHER! NO BOLTS!

INSTALL TICO ANTI-VIBRATION PADS

FOR THE COTTON, WOOL, JUTE AND ALLIED SYNTHETIC FIBRE INDUSTRIES

TICO Anti-vibration Pads are obtainable in two standard types—BLOCK, and RECESSED, as illustrated. The BLOCK type is for normal installations, where machines are heavy and working speeds medium and low. The RECESSED types are for lighter-weight machines where higher-frequency vibrations occur.

- **TICO Pads reduce noise, disperse ground thump and thus reduce fatigue to both operator and machine.**
- **Considerable time and labour is saved when weaving sheds are being re-spaced.**
- **Simple and efficient in installation ; eliminate the need for holding-down bolts.**
- **On Ring Frame applications they counteract roller vibration and eliminate frequent re-setting.**



BLOCK TYPE

SPECIMENS OF RECESSED TYPES

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A fight between two mustang stallions was quite a common sight on the American plains where wild horses roamed in their thousands in the late 18th and the 19th century.

Of course, in the 20th century, when engineers want flexibility in the horse-power under their control they instinctively think of the hall-mark "SILENTBLOC" for

FLEXIBLE COUPLINGS, FLEXIBLE BEARINGS & ANTI-VIBRATION MOUNTINGS.

Collected over many years, there is a wealth of technical information at your disposal. When a project is on the drawing-board our technicians can be of most help to you . . .

COME TO US AT THE DRAWING-BOARD STAGE

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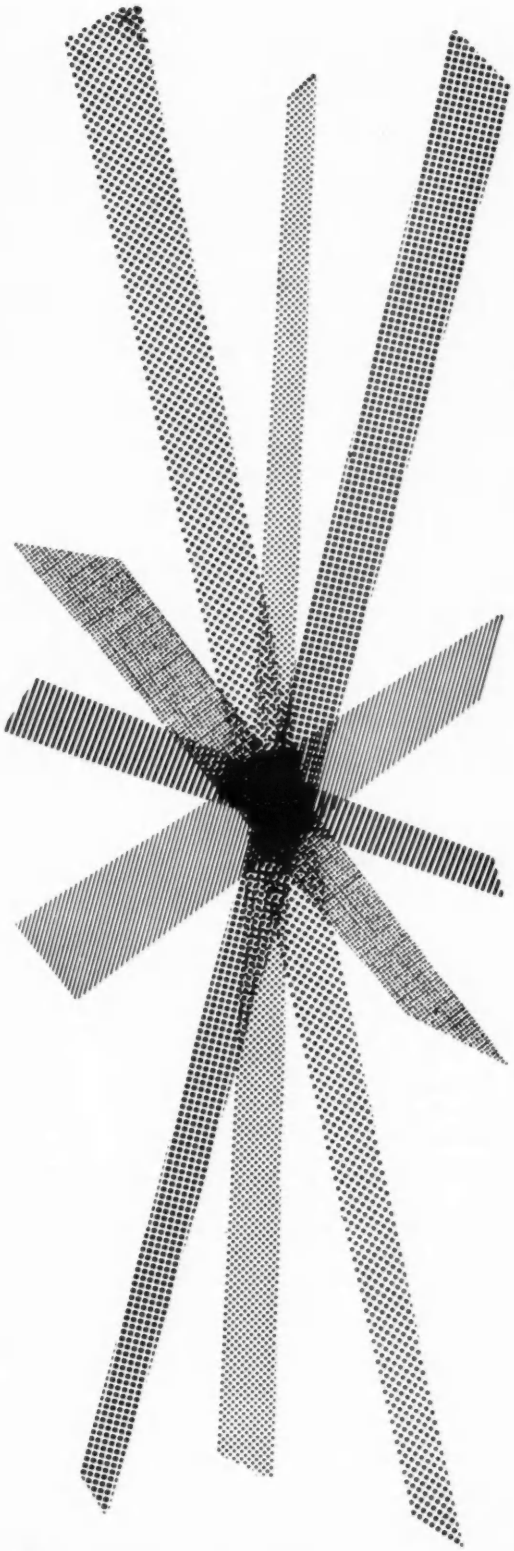

Courtaulds new CARRIER LB FOR DYEING 'TRICEL'

DOES *THIS*:

★ Gives shades of hue or depth so far unobtainable with other carriers

★ Increases the rate of dyeing in deep shades

★ Uses less dyestuff for all shades

★ Makes 'Tricel'/'Fibro' blends less prone to creasing by reducing dyeing time

★ Improves the handle of 'Tricel'/wool blends by reducing dyeing time

YET DOES *NOT* DO THIS:

★ Condense in the dyeing machine—Carrier LB is non-volatile

★ Impair the fastness properties of disperse dyes

★ Impair the pleat retention or pleatability of fabrics

Carrier LB—a pale self-emulsifying oil—is obtainable in 5 gall. cans (50 lb. lot) 3/- per pound, delivered

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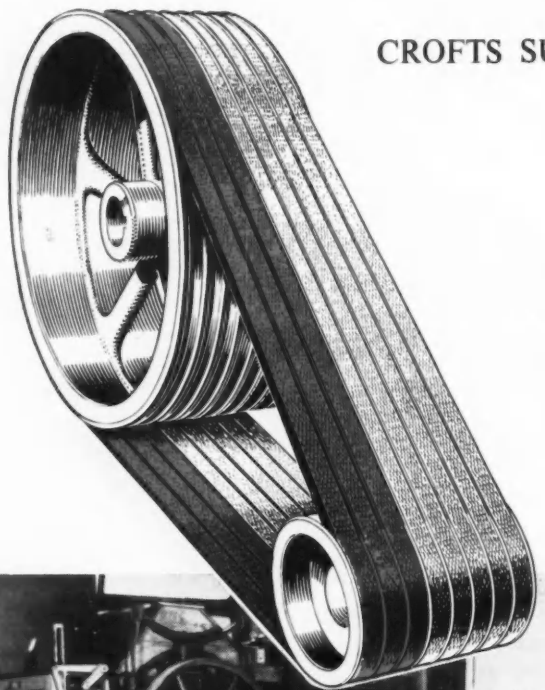
CROFTS SUPROR SURE-GRIP V-ROPE DRIVES

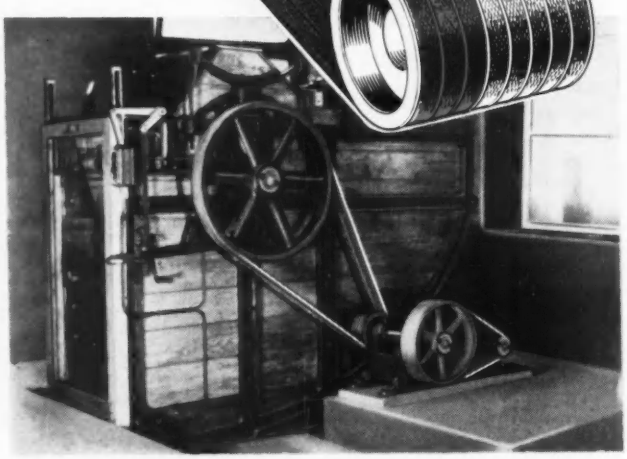
Standard drives up to 950 h.p. Ratios up to 8 : 1

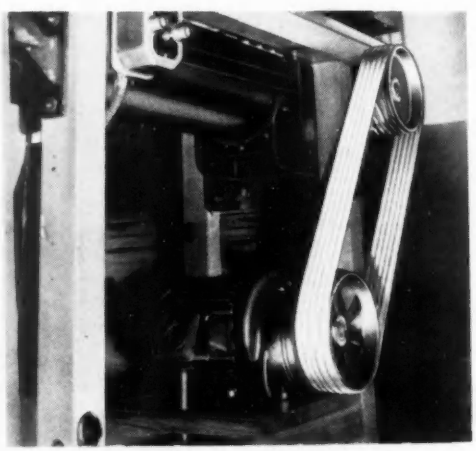
Publication 156



- premium grade ropes give 25 to 75% more power, yet retain long-life durability
- pulleys supplied with either parallel-bored and keywayed or fitted with quick-change Crofts Patent Taper-Flushbush

drives up to 150 h.p. from stock





These applications are typical examples of the adaptability of Taper-Flushbush V-rope Pulley drives

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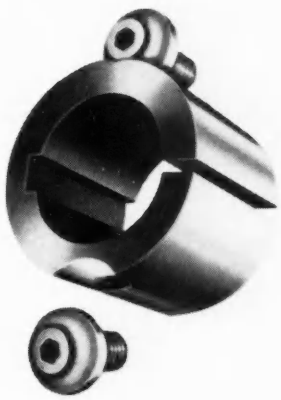
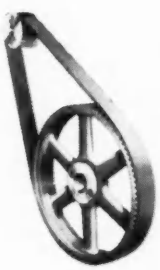
$\frac{3}{8}$" to $4\frac{1}{2}$" bore from stock

Publication DM15



- Easy to fit or remove
- interchangeable bushes to fit a wide range of shafts
- many sizes of Crofts pulleys, chain sprockets and flexible couplings are fitted with the Patent-Flushbush.

You can buy the bush to fit to your products or we can supply it in a hub ready to weld on to your conveyor drives, etc.



Powergrip "geared belt" Drives fractional to 300 h.p. ; precision positive drive. Speeds from inches per minute to 16,000 f.p.m. without slip

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Roller Chain Drives sprockets with Taper-Flushbush or parallel bore.
Single, duplex and triplex drives to 120 h.p.

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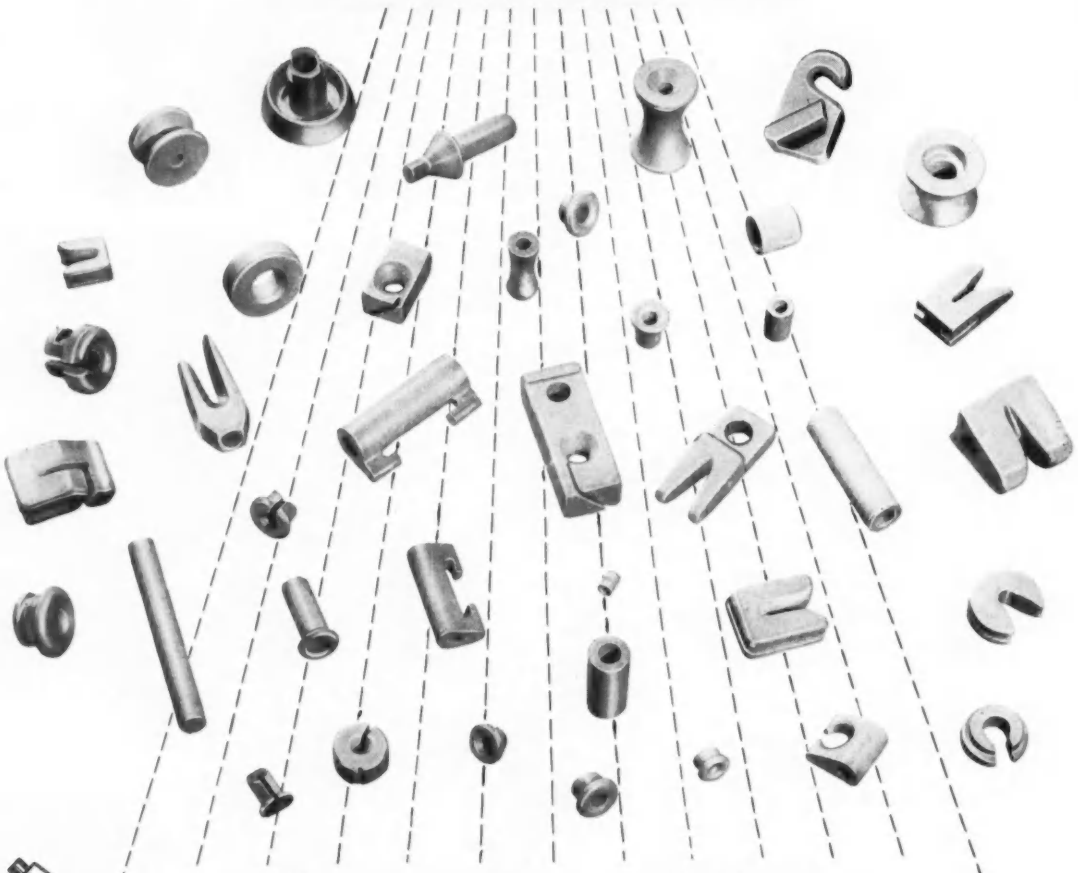

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Ideally suited for EVERY KNOWN FIBRE.
FARADEX' can be supplied in "CONDUCTING" or "NON-CONDUCTING" material in controlled matt or highly polished surfaces.

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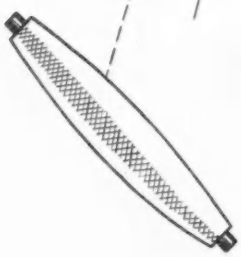

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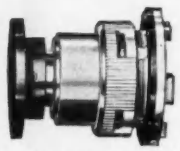
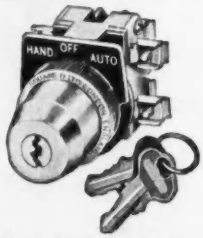
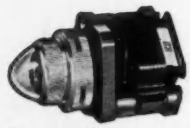


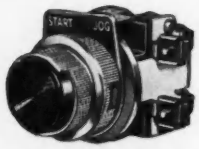
Pushbuttons — Full guard, half guard and mushroom types in many colours.



Key-operated selector switches—Two and three positions with choice of key withdrawal arrangements.



Pilot lights—For voltages up to 550V with many lens colours.



Selector pushbuttons—Combine features of both types of operations. Many combinations available.

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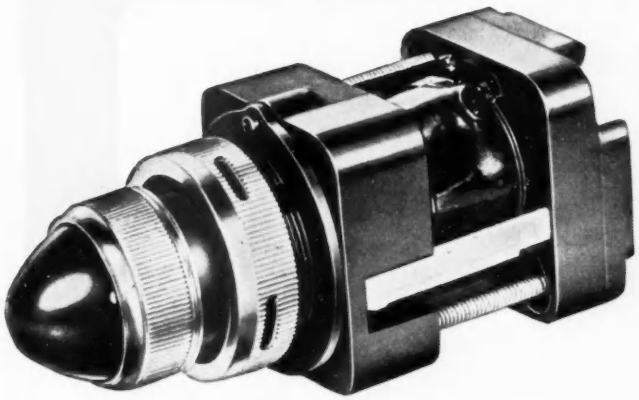
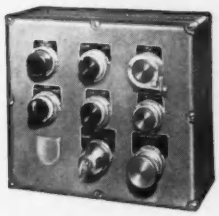
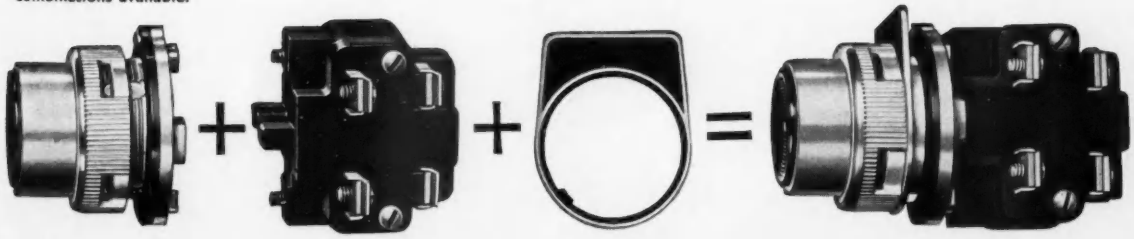


Oil-tight construction. Give positive contact 'feel' in the test position—eliminating contact doubts in the event of bulb failure.



Diecast oil-tight enclosures for up to sixteen units—Featuring the exclusive "swing-way" hinge.

Selector switches—Cam arrangements to meet almost unlimited circuitry, including spring return models.



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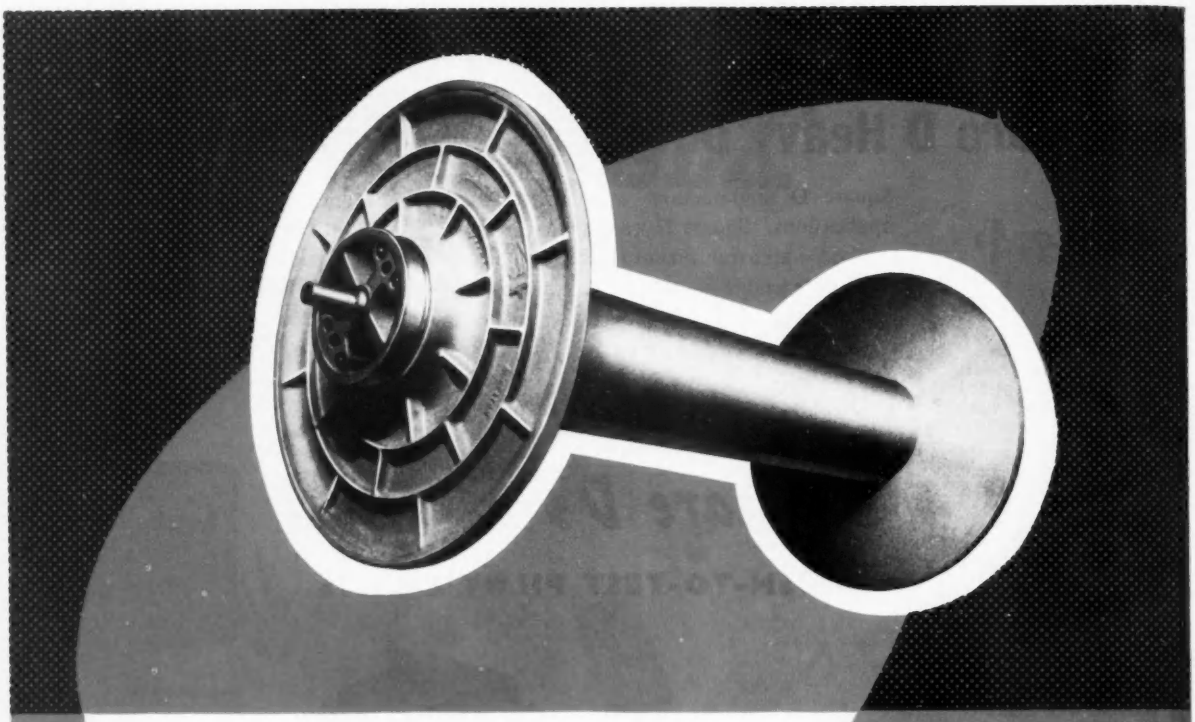

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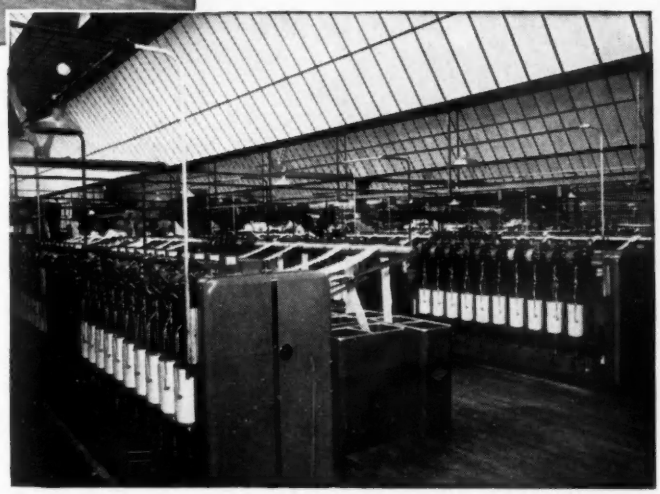
A TRIBUTE TO RAPER AUTOLEVELLING .... by the Worlds LARGEST USER

A part of the Drawing room at the Darlington factory of Patons & Baldwins Ltd.



Messrs. Patons & Baldwins Ltd., pioneered the development of the Raper Autoleveller Drawing System and have remained enthusiastic users. The following tribute requires no further comment :

"*The Bradford System Raper Drawing sets have been installed on a wide scale at each of the Company's worsted branches in the United Kingdom, Canada and Australia and the total poundage processed through these sets to date has now reached eight figures.*

So large a weight without trouble confirms the many careful tests carried out by us on all types of slivers. We are satisfied that yarn levelness is equal to Conventional Drawing and count variations superior.

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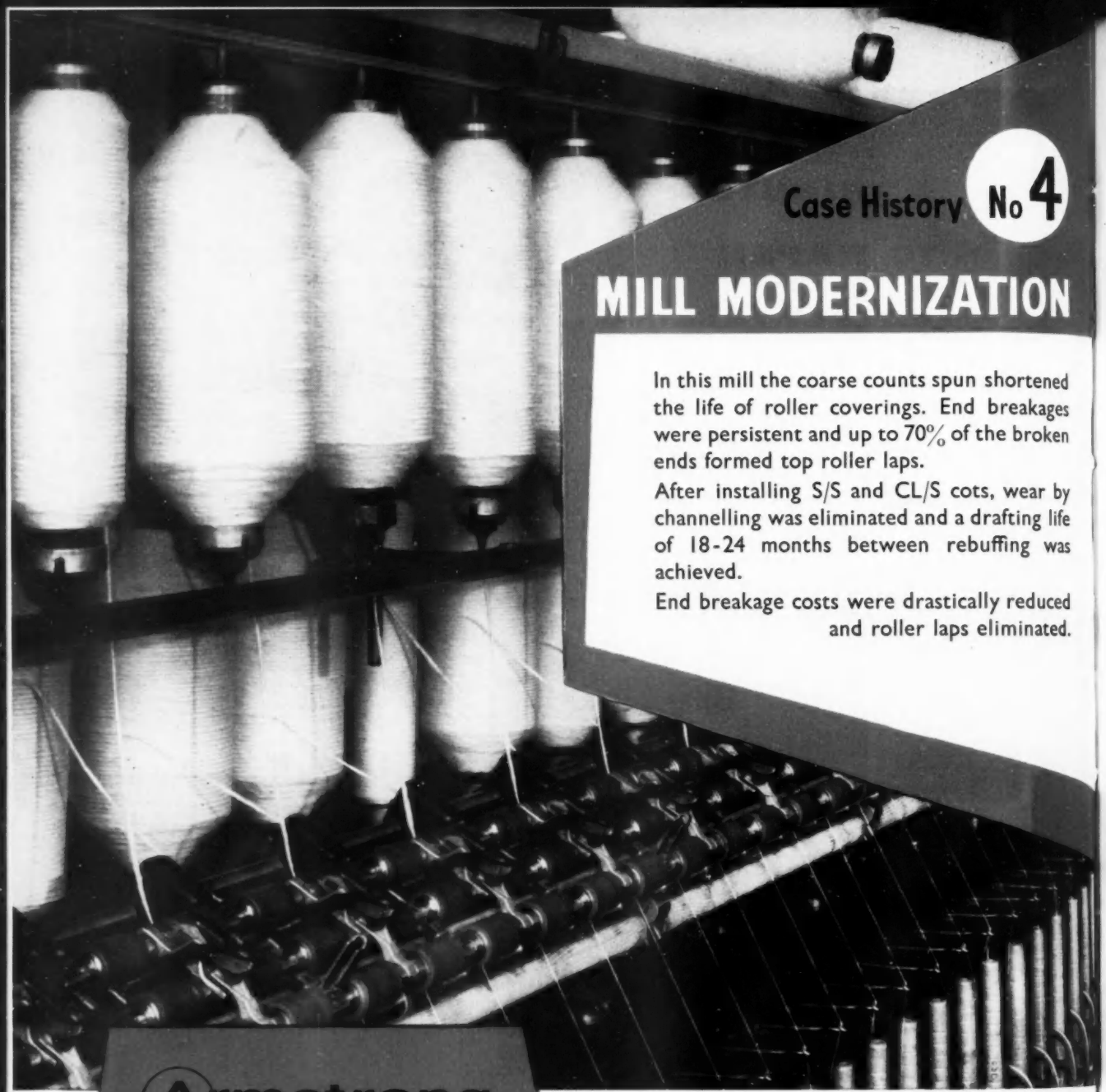

Case History No 4

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In this mill the coarse counts spun shortened the life of roller coverings. End breakages were persistent and up to 70% of the broken ends formed top roller laps.

After installing S/S and CL/S cots, wear by channelling was eliminated and a drafting life of 18-24 months between rebuffing was achieved.

End breakage costs were drastically reduced and roller laps eliminated.

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ACCOTEX*

COTS & APRONS

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MECHANICAL HANDLING EXHIBITION
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UNDER ALL CONDITIONS *Specify*

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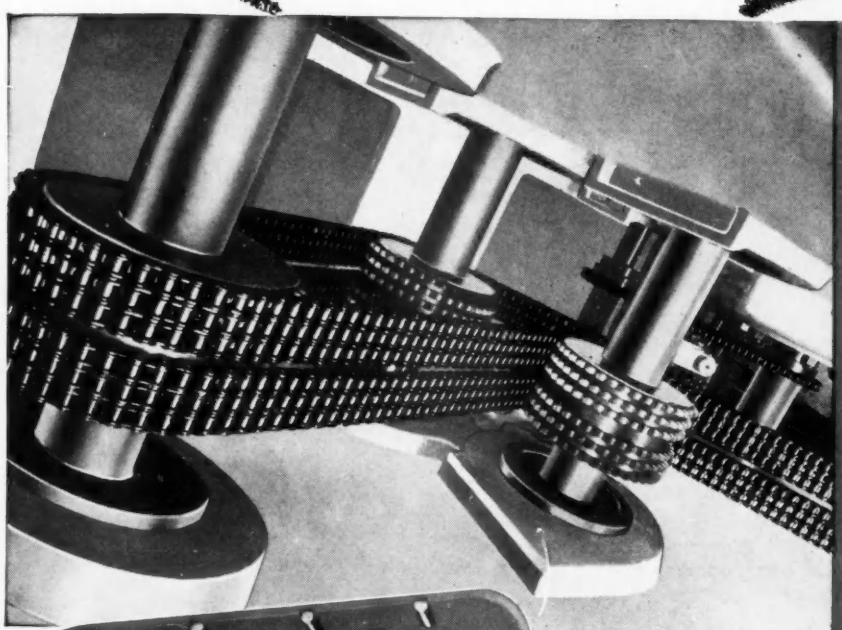
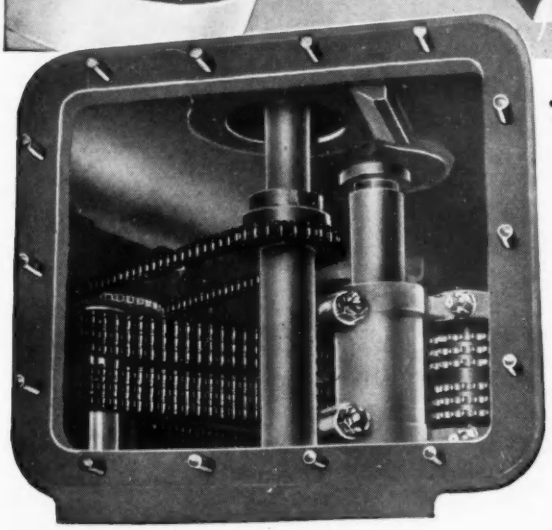
MULTI-STRAND CHAIN DRIVES

—BRITISH NYLON SPINNERS DO!



These photographs illustrate Perry multi-strand chain drives as used extensively by British Nylon Spinners Limited. For long and *consistently* reliable service it pays to specify Perry. Let our technicians help to solve *your* chain drive problem. Your enquiry will be given immediate and expert attention.



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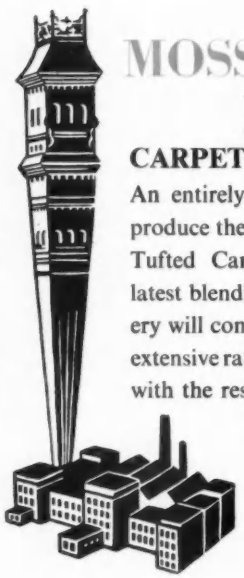
The productions of these mills are styled to cater for the specialised requirements of the suiting and dress fabrics trades. Colour appeal, durability and price factors are all considered in the well recognised qualities offered by this company. The incorporation of the latest developments in new synthetic fibres, combined with experienced use of Spun Dyed Colours adds to the reputation of "India Yarns".



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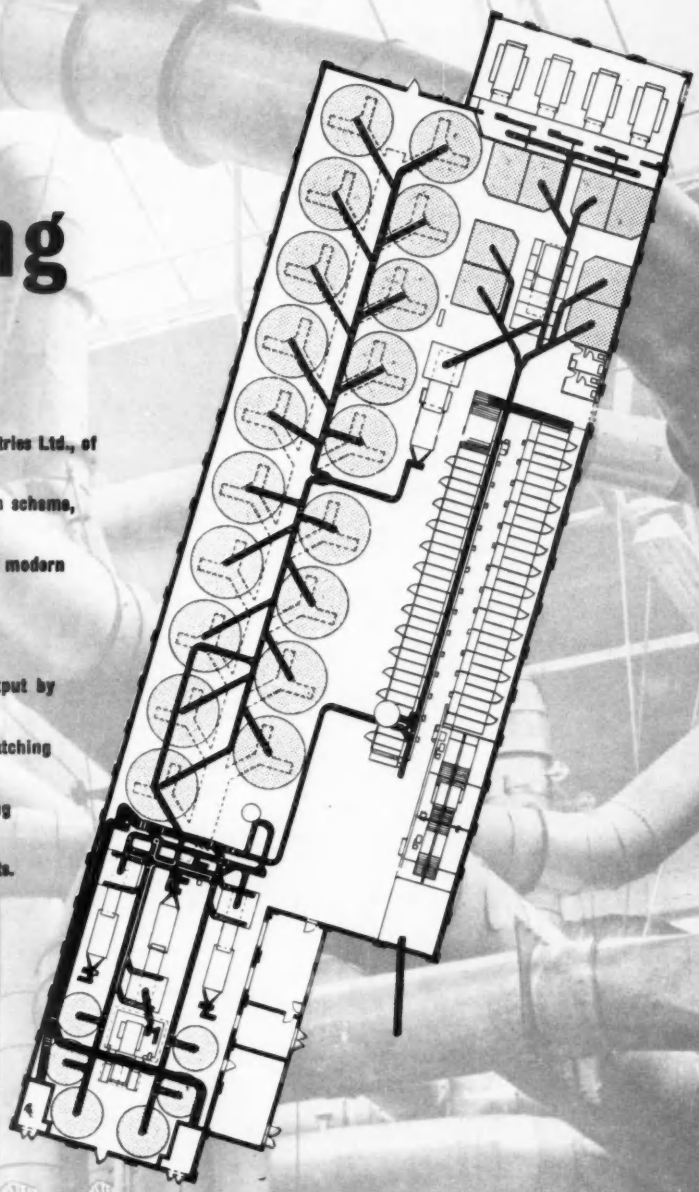
This new plant greatly increases output by simplifying standardisation and the matching of colour and quality whilst effecting considerable savings in production costs.



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the complete system was designed, constructed and installed by

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TURNERS Premium V-BELT

with the NEW super strength member
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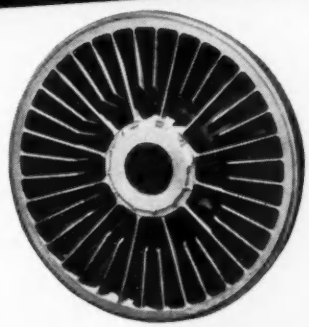

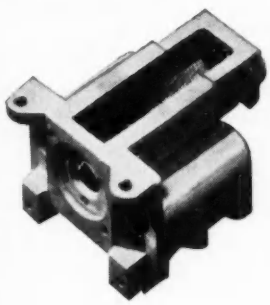

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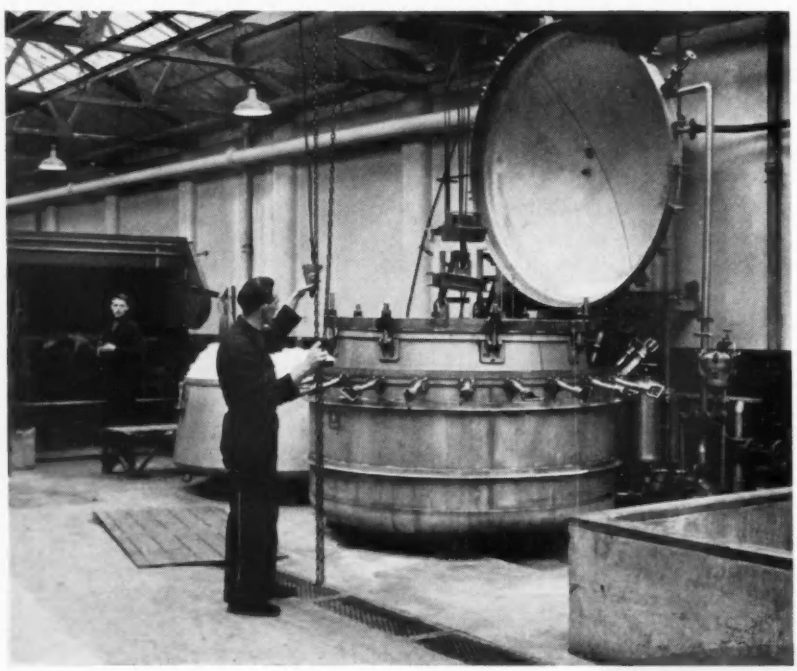
Machines suitable for operation at temperatures up to 130° C.



Whatsoever the dyeing problem, be it connected with natural or synthetic fibres, Longclose will help you to solve your problem.

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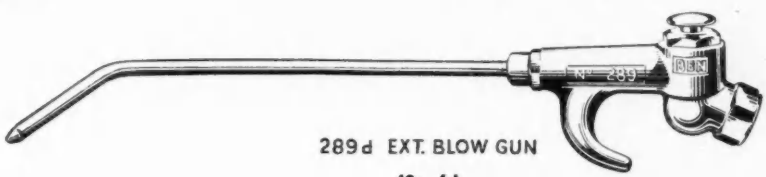

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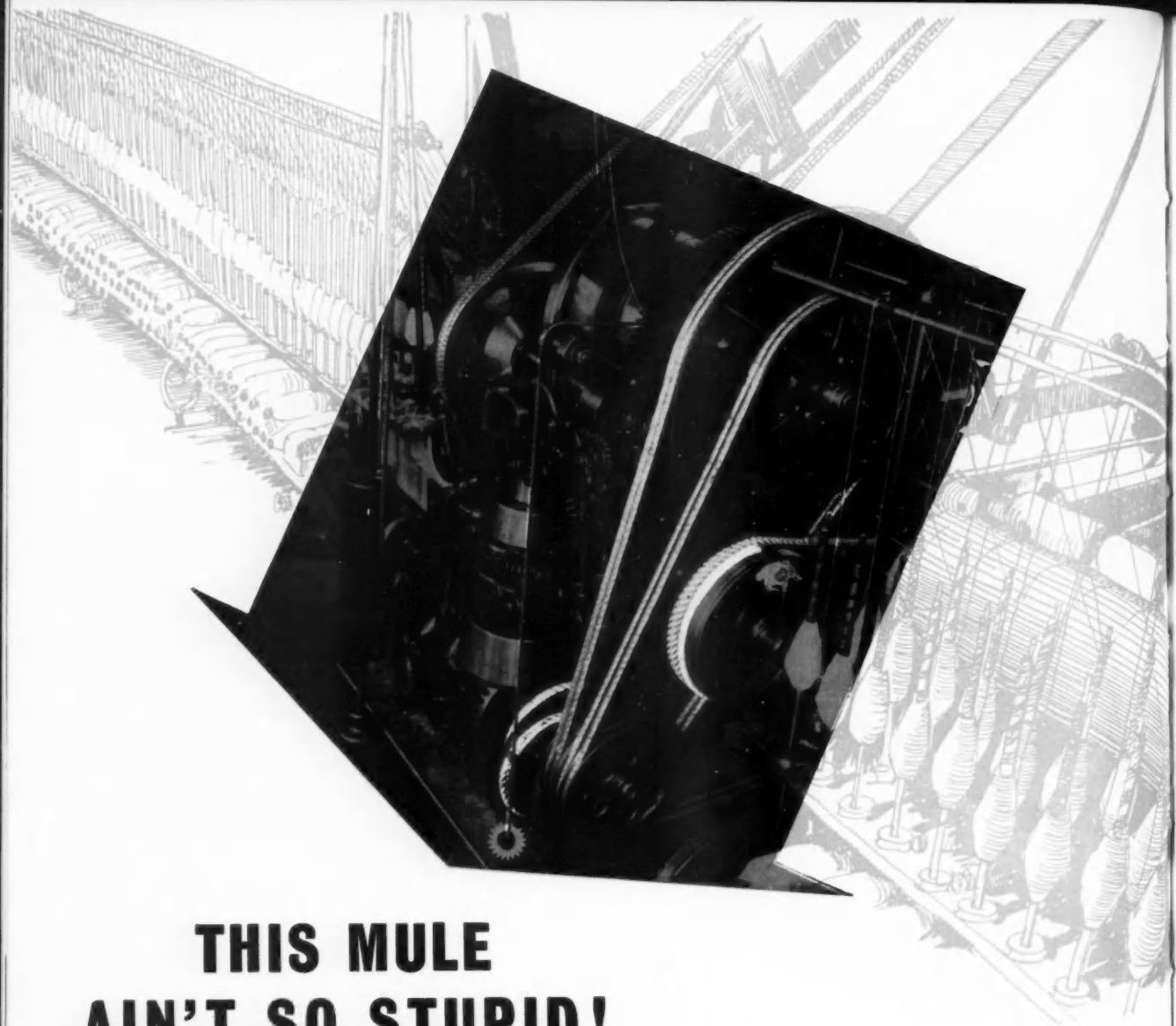
CP. 268

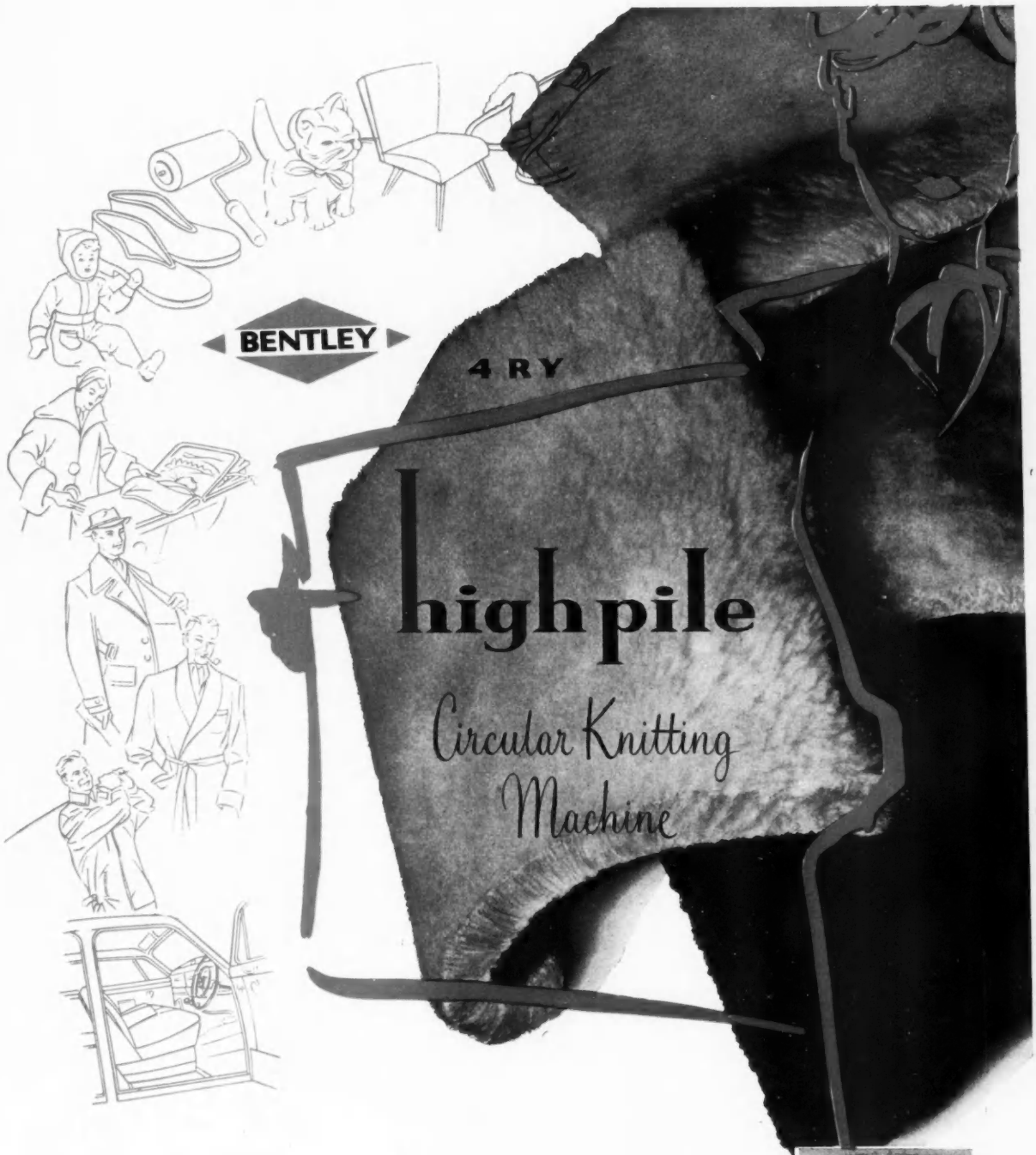


THIS MULE AIN'T SO STUPID!

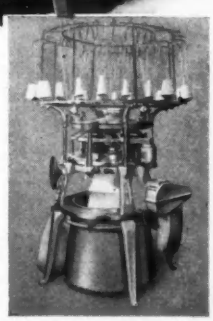
The operators of this particular mule get quite a kick out of its increased efficiency since Ledray's Kirkstall Brand Textile Ropes were installed. The down band is a Cotton rope, both rim and draw bands are made of Nylon, while the scroll bands are of blended Nylon and Cotton. Kirkstall Brand Textile Ropes and Bandings are now available in Cotton, Nylon and Terylene, or Cotton blended with Nylon or Terylene. Please write for our technical advice if in doubt as to the best type of rope for your requirements.

KIRKSTALL BRAND ROPES BY LEDRAY

SAMUEL LEDRAY AND SONS LIMITED
ST. ANN'S MILLS · KIRKSTALL · LEEDS 5 · ENGLAND



The new Mellor Bromley 4 R Y machine in 24" diameter and with eight knitting feeders, produces approximately 11 yards of high pile fabric per hour and requires only one operator for four machines. By the use of appropriate natural or man-made yarns or combinations of both, a wide range of fabric qualities and finished effects can be obtained, suitable for a wealth of applications.



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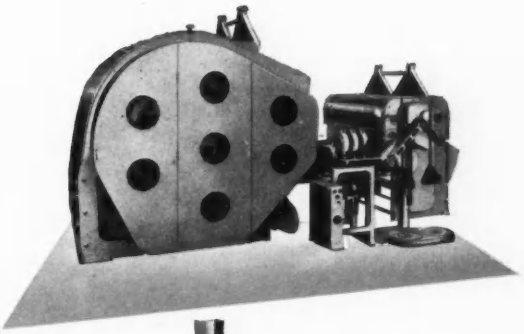

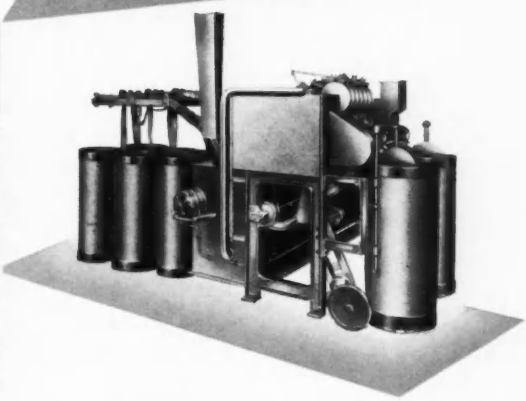

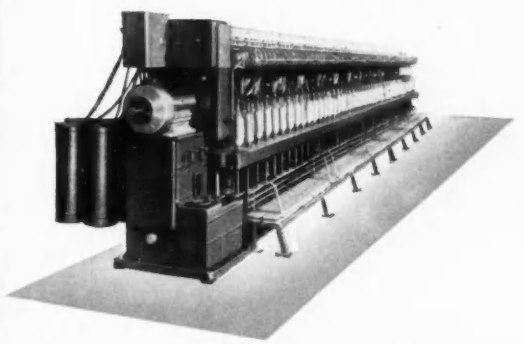

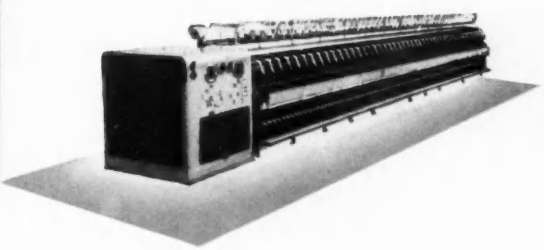

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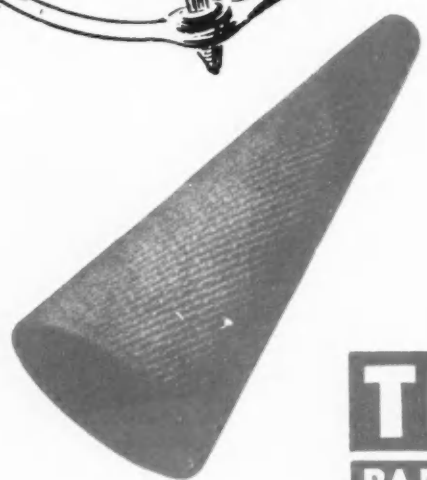

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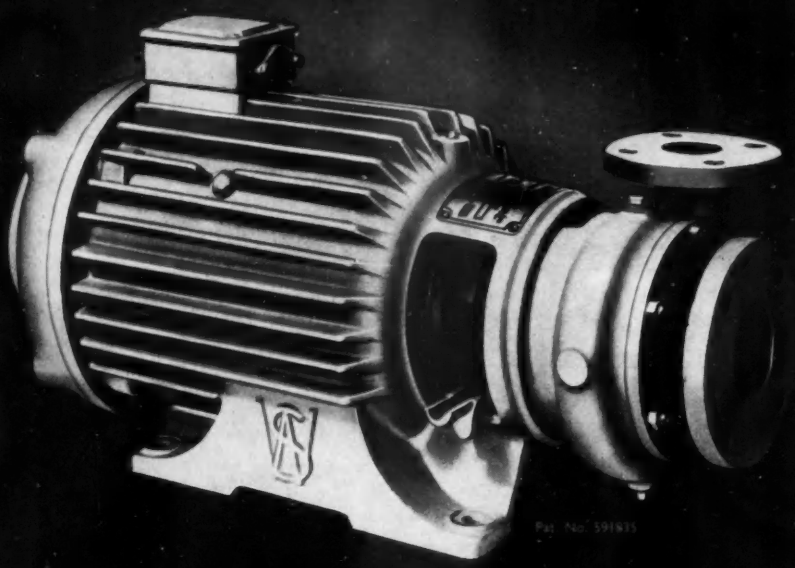
Worthington-Simpson pumps in WORTHITE, superior alloy steel, offer full corrosion resistance to sulphuric and many other acids and alkalis. For pumping mildly corrosive liquids, 18/8/3 Stainless Steel is specially suitable and it will not contaminate or discolour non-corrosive liquids. This range of pumps is of cost-saving Monobloc construction, and the pumps themselves have interchangeable stuffing box glands and mechanical seals to permit simple changes to suit different processes.



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in WORTHITE and 18/8/3 STAINLESS STEEL

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Acetic Acid, glacial
Acetic Anhydride
Acetone
Alcohols
Benzoic Acid
Boric Acid, cold
Butyric Acid
Calcium Bisulphite
Caustic Potash, 70°F
Caustic Soda up to 50%
Chlorosulphonic Acid, 120°F (pure)
Chloroform
Copper Sulphate
Ethyl Acetate, 70°F
Fatty Acids
Formaldehyde, 70°F
Glycerine
Magnesium Sulphate, 5%, 70°F
Nitric Acid, all concentrations
Oleum, up to 120°F
Phosphoric Acid, 10%, 70°F
Phosphoric Acid, 85%, 70°F
Refinery Crudes
Silver Nitrate, 70°F
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put it to the test

write for WORTHITE & 18/8/3 Specimen Discs and test them under your own site conditions

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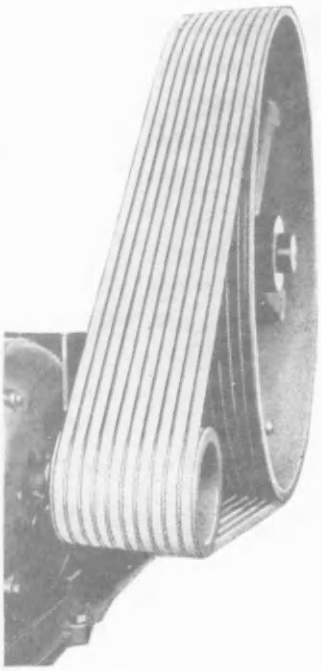

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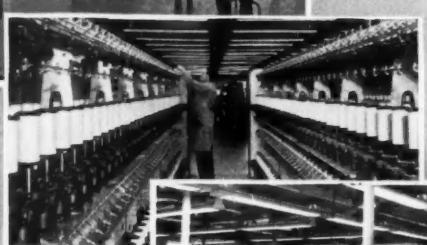

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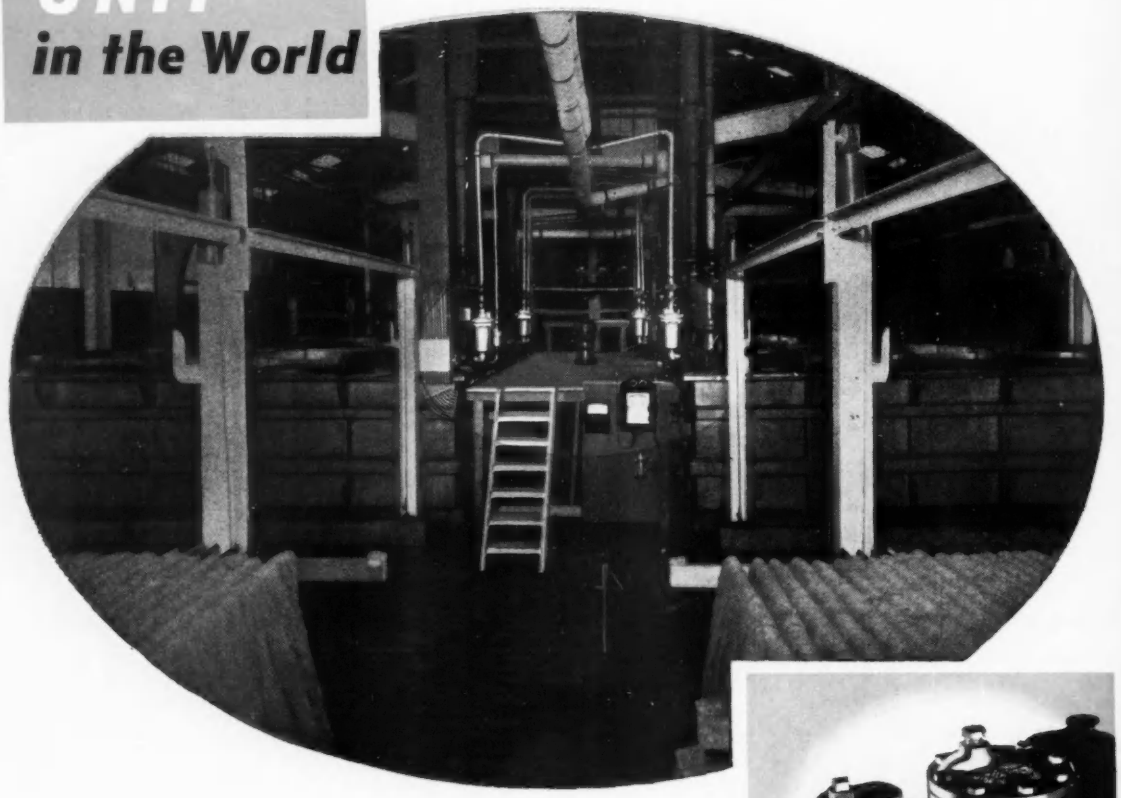

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Drayton-Armstrong Traps are supplied in vertical, horizontal and angle types.

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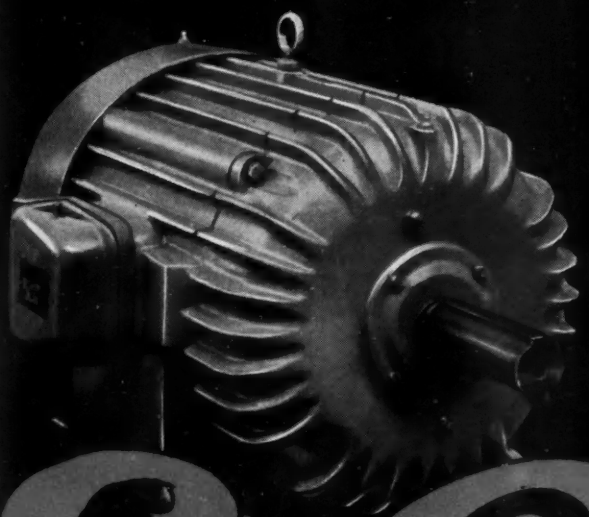

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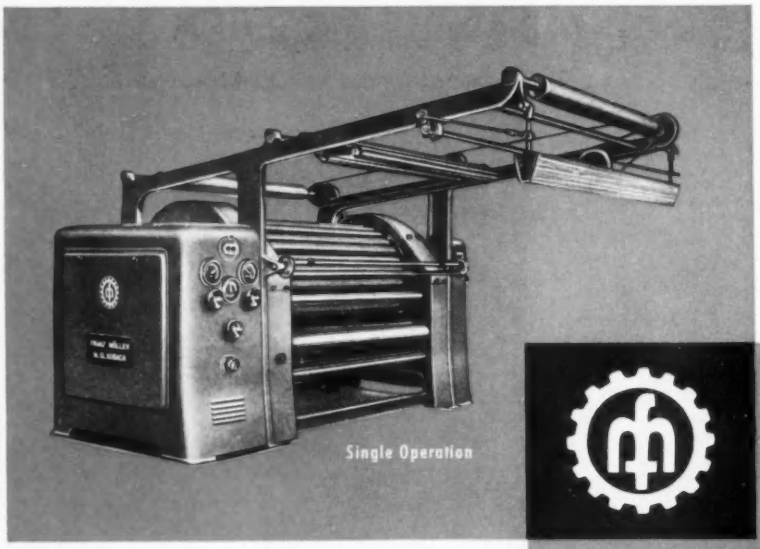

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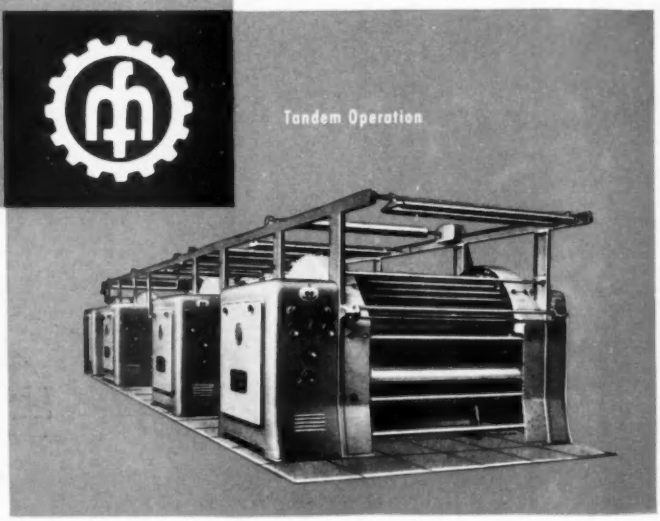

30 of these high speed raising machines replaced 80 standard machines in a North Carolina mill

for reasons of:

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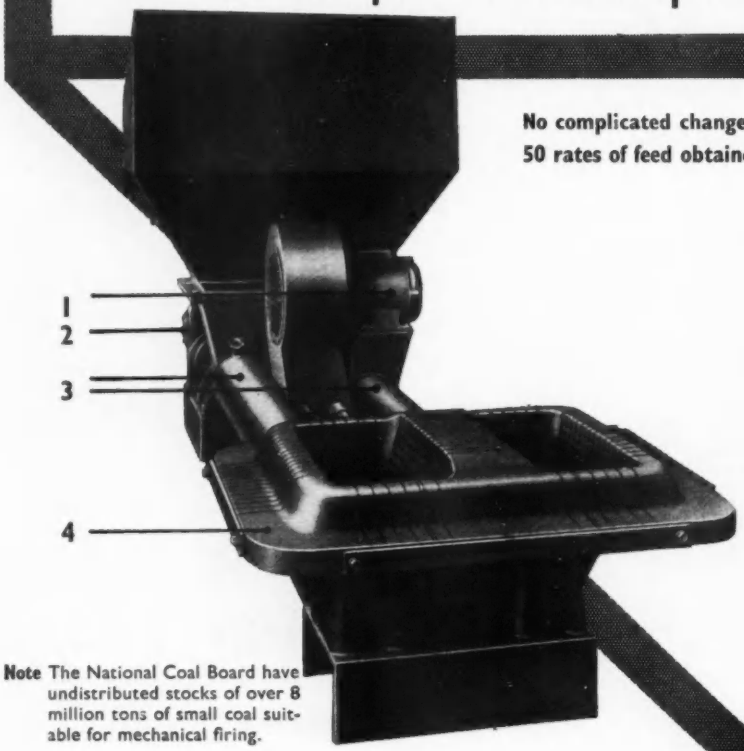
Hodgkinson "Meterfeed" UNDERFEED STOKER — smokeless and of simple and unique design



No complicated change speed gear-box but equivalent of 50 rates of feed obtained electrically.

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2 Stoker is automatically stopped and alarm given in event of shear pin fracture.

3 Twin worms on larger sizes to promote even coal distribution.

4 Tuyeres can be supplied in 30 per cent chrome iron.

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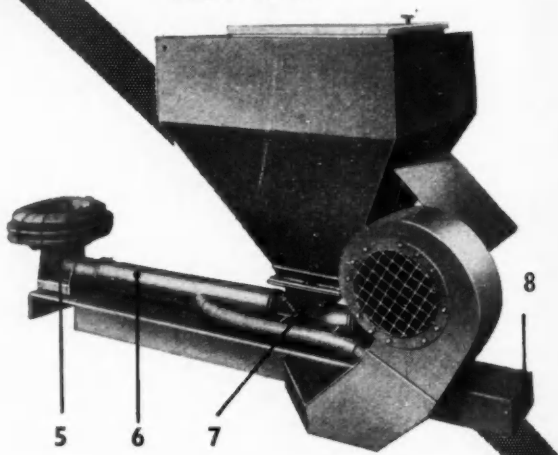

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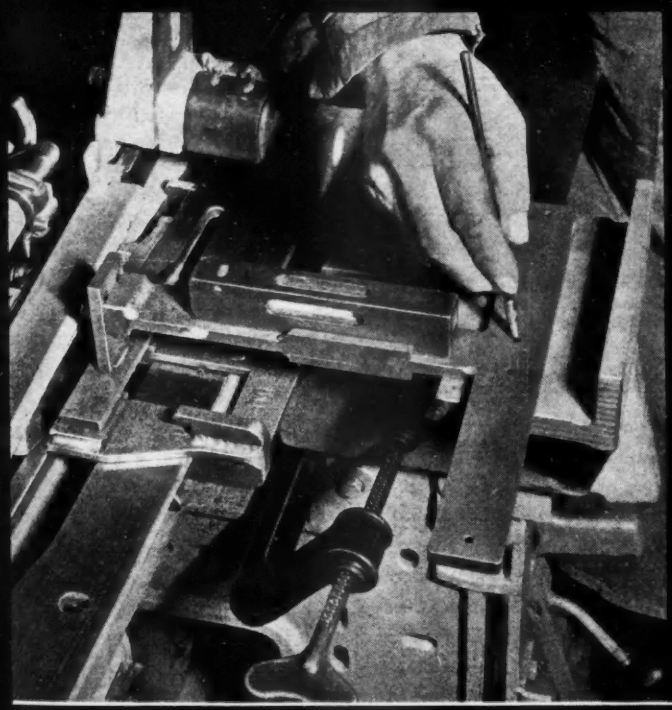

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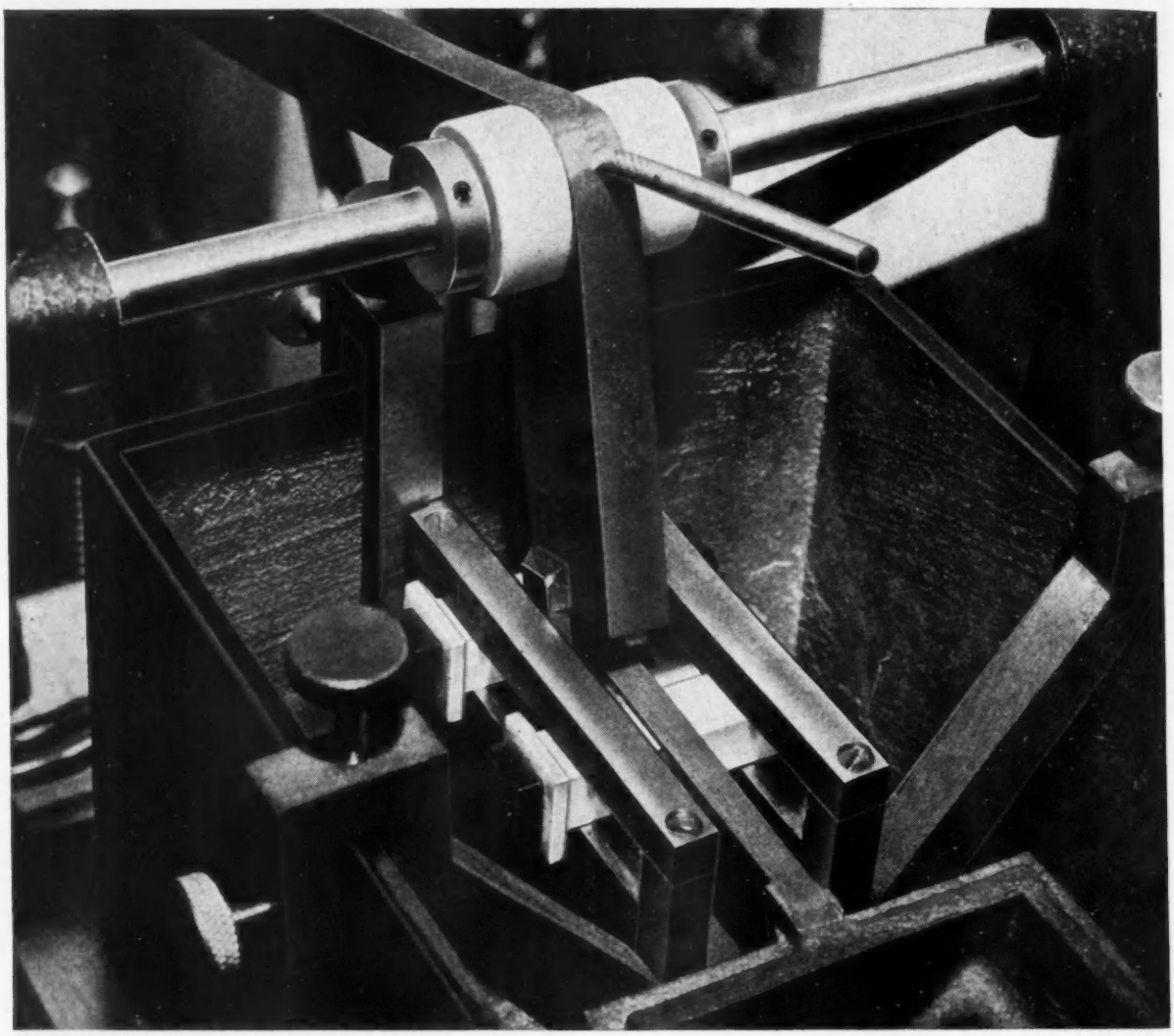

The Dunlop Rubber Co. Ltd., (G.R.G. Div.) coated the sliding surface of these components with 'Fluon' p.t.f.e. for the British Hat and Allied Feltmakers Research Association.

Bearings in this new felting research apparatus could only be made from 'Fluon'

THIS JOURNAL BEARING and crosshead are part of an apparatus made to investigate the frictional grip between felt and the materials used for fabricating the moving parts of felt-making machines. This is important in all felting machines because the felting action is transferred to the material by the frictional grip between these moving parts and the felt while both are immersed in hot sulphuric acid. Both the journal bearing and the crosshead have sliding surfaces made from 'Fluon' polytetrafluoroethylene.

The crosshead has to operate while immersed in hot sulphuric acid and the presence of lubricants on the whole apparatus would cause contamination of the solutions and surfaces. It was therefore necessary to fit low friction dry bearings which would be proof against acid attack at high temperatures. 'Fluon' p.t.f.e. proved the only possible material for these surfaces.

'FLUON'

'Fluon' is the registered trade mark for the polytetrafluoroethylene manufactured by I.C.I.

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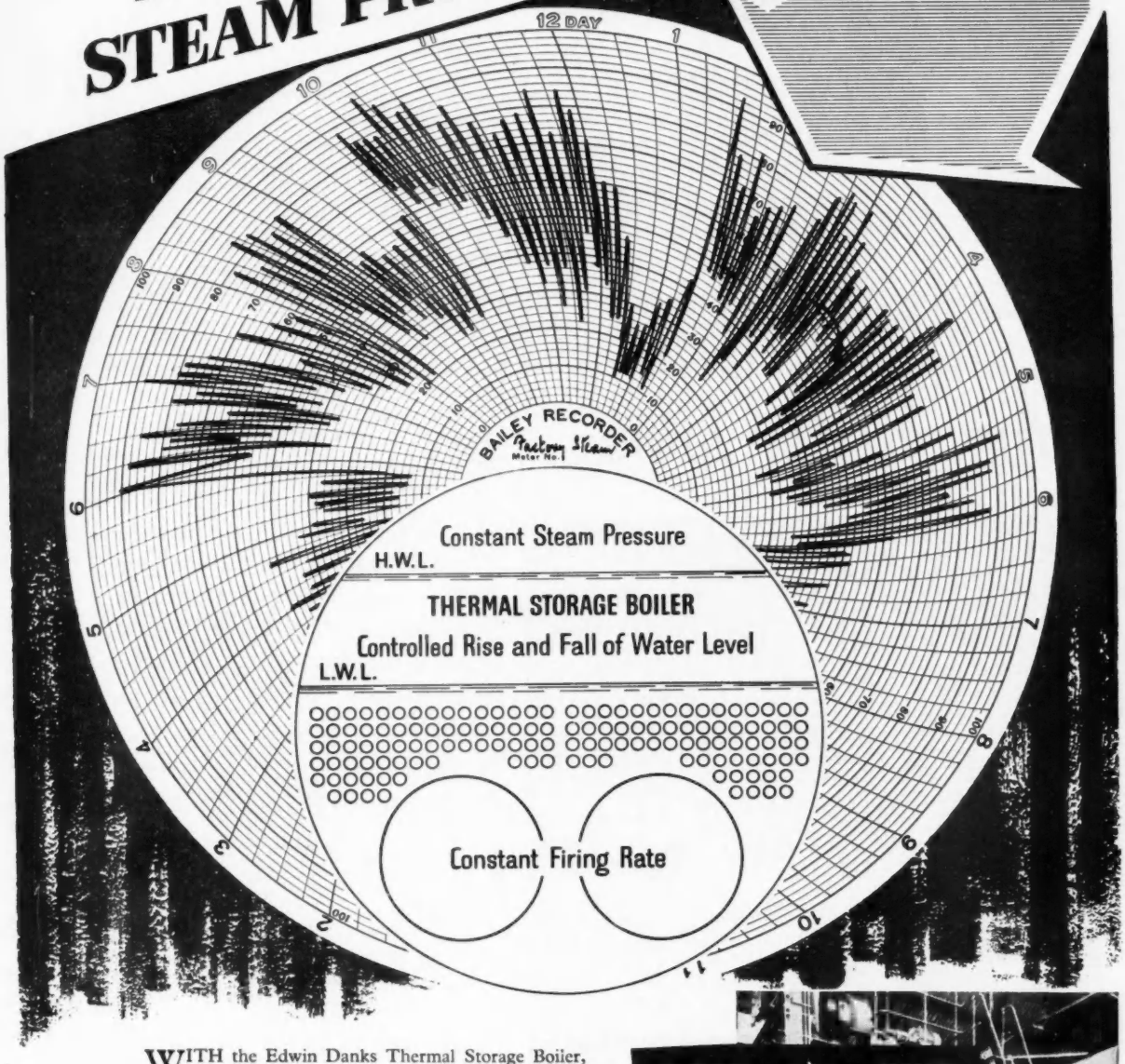
PF. 37

IS THIS YOUR STEAM PROBLEM?



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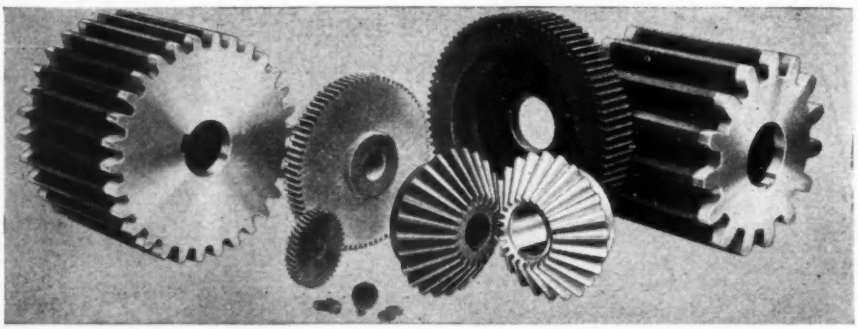
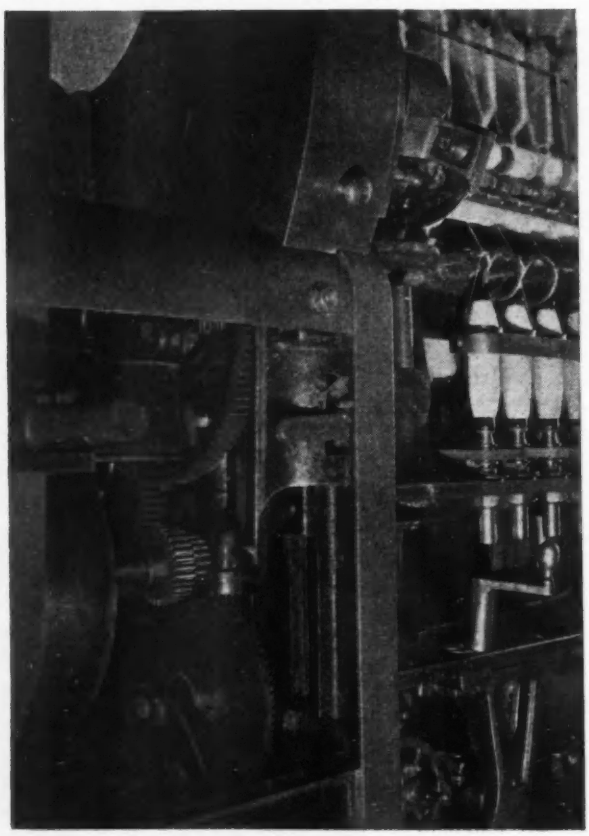
Right wheel



for quieter mills

TUFNOL gear wheel driving tin roller on ring spinning frame



TUFNOL gear wheels run quietly with the minimum of vibration because their slight resilience absorbs shock and enables them to mesh evenly with their mating wheels. At the same time TUFNOL resists corrosion and is extremely hard-wearing — qualities which have been proved by constant use under exacting conditions in many modern mills.

TUFNOL gear wheels can be made to specification in our own Works ; or we can supply TUFNOL sheet or blanks from which users can machine their own.

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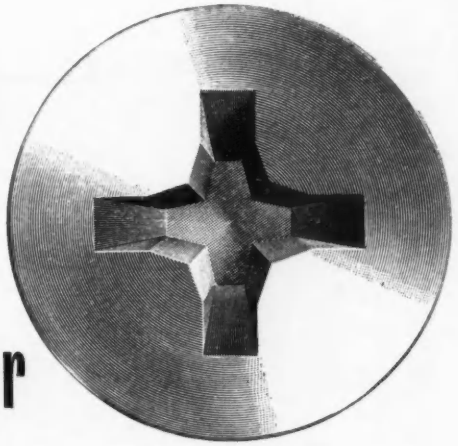
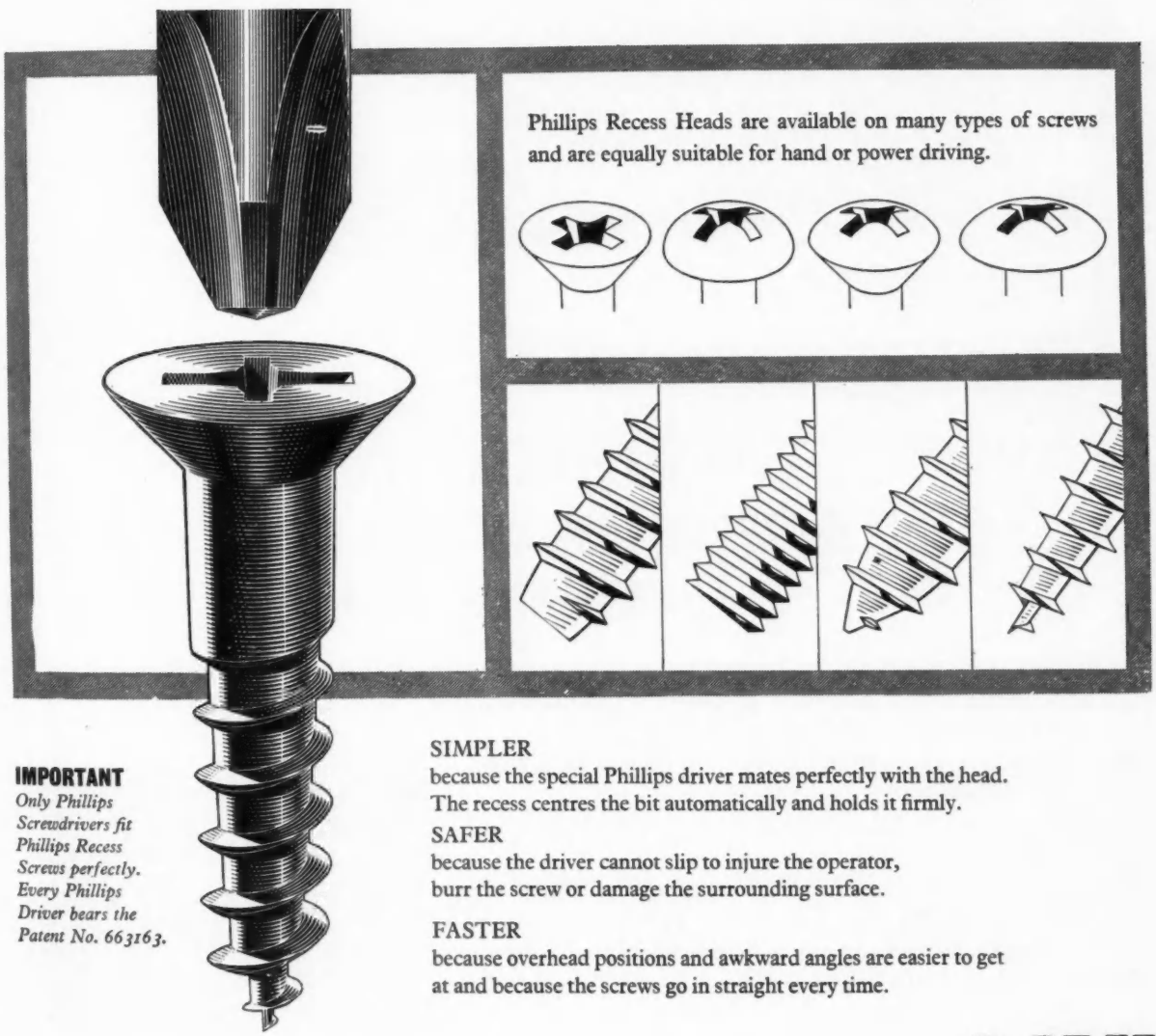
make screwdriving simpler, safer, faster





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because the driver cannot slip to injure the operator, burr the screw or damage the surrounding surface.

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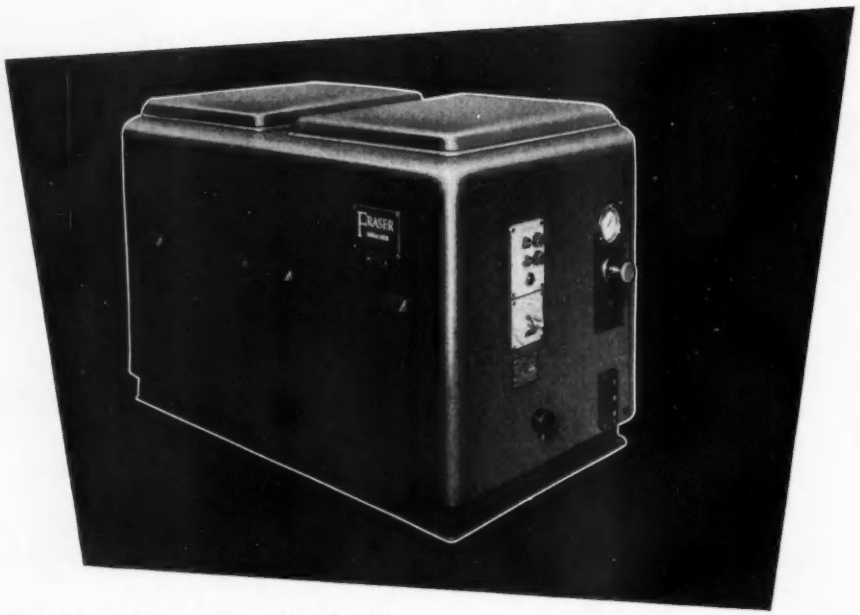

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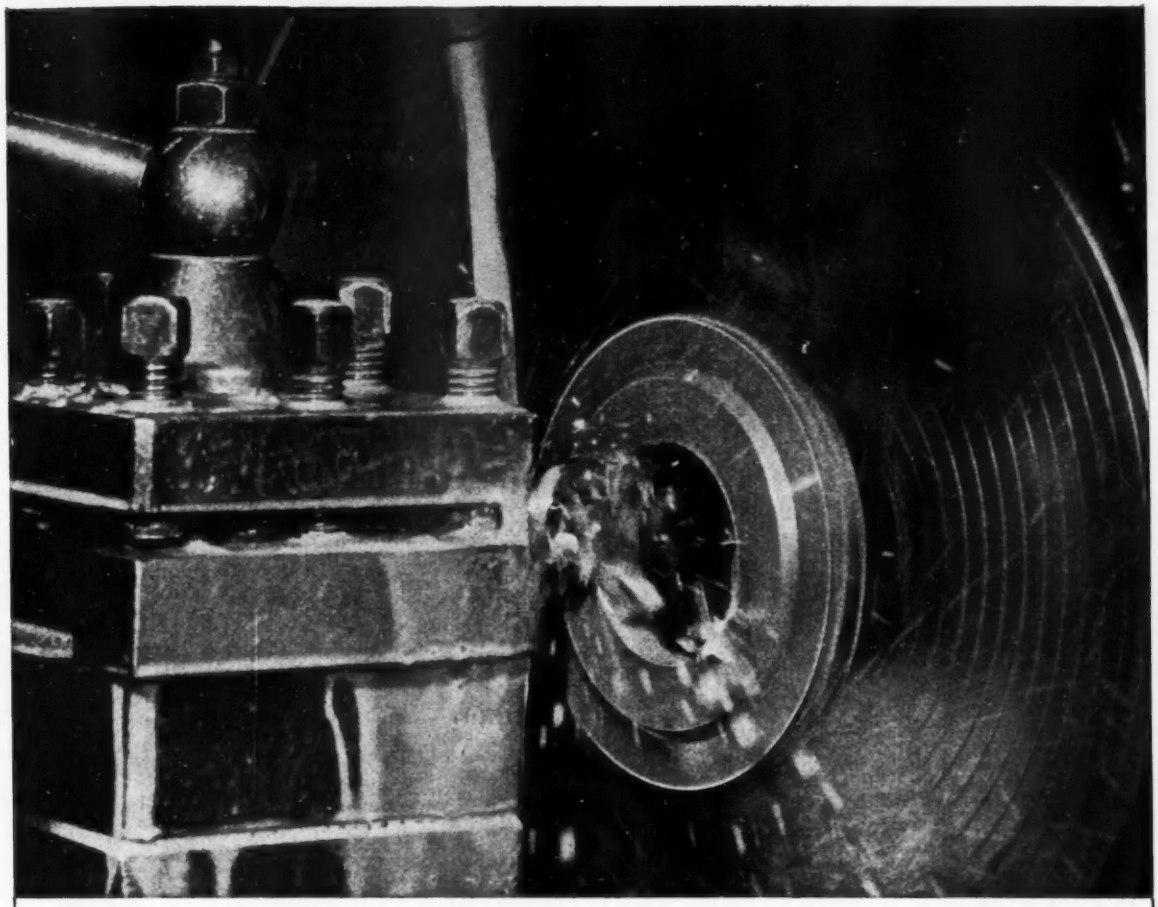
- Changes in Proportions of Oil or Water Immediately Effective.
- For Use with Jute Softener or Goods Spreader Machines.
- Permits Use of Smaller Proportions of Emulsifying Agent.
- Eliminates Human Error & Reduces Labour Costs.
- Low Power Consumption.

FRASER
ARBROATH

DOUGLAS FRASER & SONS LIMITED
ARBROATH **SCOTLAND**
PHONE ARBROATH 2033-5. ***GRAMS "FRASER" ARBROATH.***



There is danger here — danger to sight and limbs. But safety can so simply take the place of that danger. "Armourplate" glass shields give certain protection. And because the operator can see what is happening he works more confidently and efficiently. Accident rates drop, and production rises when "Armourplate" glass shields are fitted.

FOR SAFETY WITH VISION FIT

"ARMOURPLATE" GLASS

PILKINGTON BROTHERS LIMITED

Consult the Technical Sales and Service Department at St. Helens, Lancs. Telephone: St. Helens 4001
or Selwyn House, Cleveland Row, St. James's, London, S.W.1. Telephone: Whitehall 5672-6

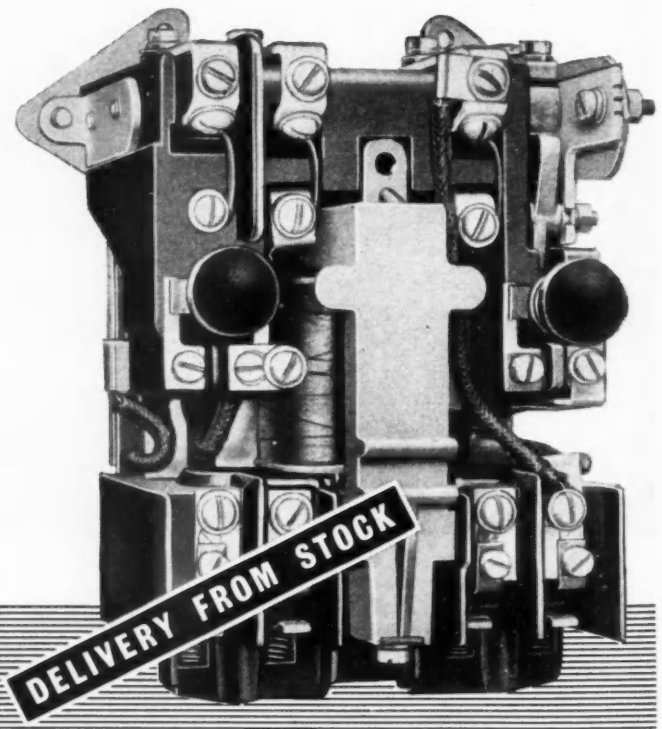
"ARMOURPLATE" is a registered trade mark of Pilkington Brothers Limited. Supplies are available through the usual trade channels

A.C. Direct-on-line
CONTACTOR STARTER

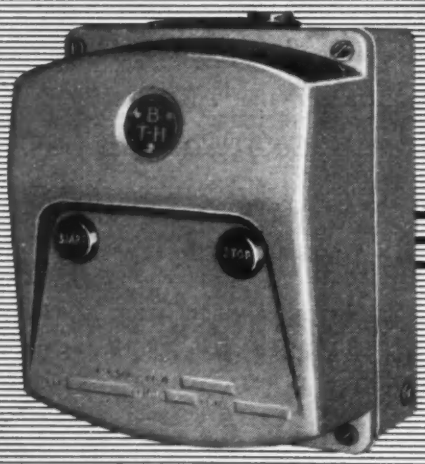
Type DOC 71 for three-phase or single-phase non-reversing squirrel-cage induction motors.

This starter is sturdy in construction, elegant in appearance, and dependable in operation. It is available for motors up to 5 horsepower, and complies with BS. 587.1957 for "Frequent Duty", i.e. forty starts per hour.

The starter, comprising a triple-pole contactor with normally-open auxiliary switch and triple-pole hand-reset thermal overload relay, is enclosed in a distinctive die-cast aluminium case with integral START-STOP push buttons.



DELIVERY FROM STOCK



Up to 5 h.p.

200-550 volts

25-60 cycles

BRITISH THOMSON-HOUSTON

THE BRITISH THOMSON-HOUSTON COMPANY LIMITED · RUGBY · ENGLAND

an A.E.I. Company.

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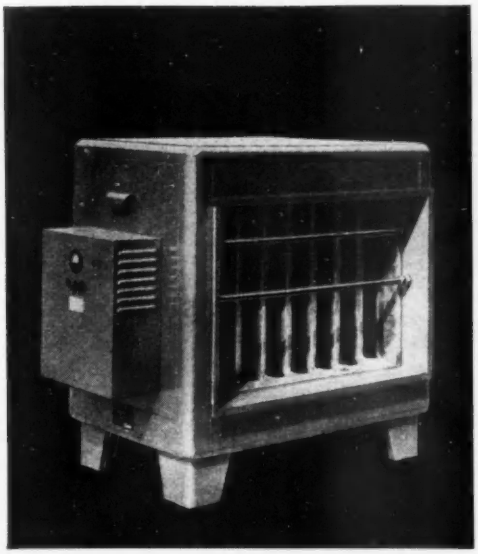

For really clean air specify TRION electronic air filters

Industrial Applications:
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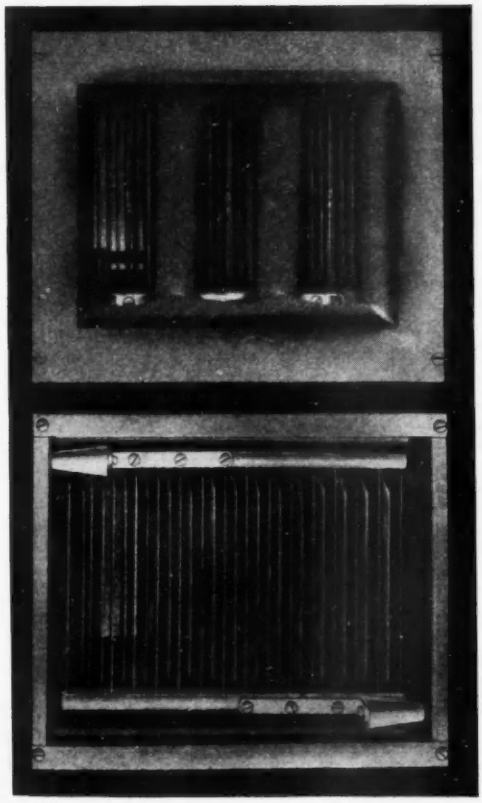
Gas Cleaning Division,
Turnbridge, Huddersfield. *Telephone: Huddersfield 5280.*

Commercial Applications:
HARRIS ENGINEERING CO. LTD.,
York Works, Browning St London, S.E.17.

TRION UK



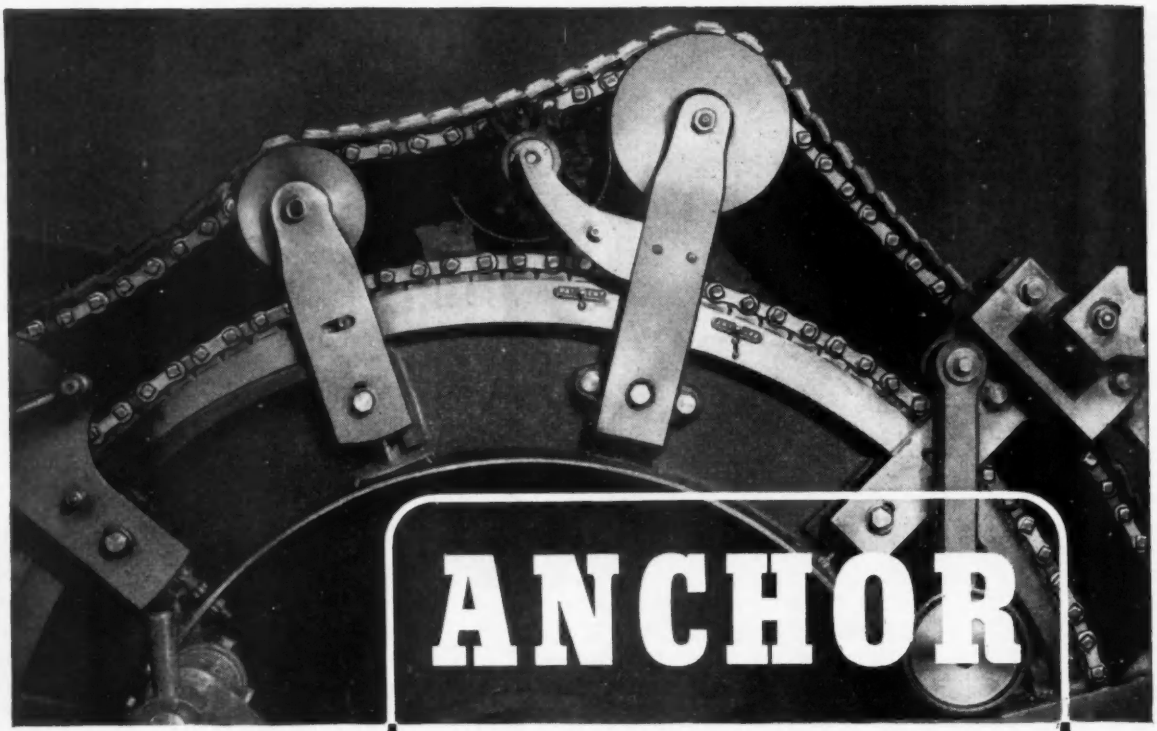
The fact that the Trion Electronic Air Filter has an efficiency of 90% on a photometric basis (99.5% on a weight basis) does not mean that it is more expensive than a mechanical filter having a much lower efficiency.

With the Trion Electronic Air Filter maintenance costs are negligible, expensive replacements are unnecessary and power consumption exceptionally low. Ten thousand cubic feet of air per minute can be electronically cleaned for the price of burning a 100 watt bulb.

Capacities of United Kingdom installations range from 250 c.f.m. to 200,000 c.f.m.

Unretouched views of inlet and outlet of Trion unit after ten weeks continuous operation. This unit protects an electrical relay system.

C 9320



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FLAT CARD CHAINS

available FROM STOCK

A NEW SERVICE

Chains are now supplied boxed in pairs, for cleanliness of handling and storage. Right and left hand screws are also available, thus ensuring a 100% job.

ANCHOR CARD CHAINS ARE MANUFACTURED FROM HIGH QUALITY STEELS WHICH ENSURE LONG LIFE AND FREEDOM FROM BREAKDOWN. SIZES AND LENGTHS TO SUIT BRITISH, CONTINENTAL AND AMERICAN MACHINES.

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(Subsidiary of RENOLD CHAINS LIMITED)

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What is striking about this picture?

Certainly the concentrated attention of the listeners. This is easily understood when you know that it shows overlookers during one of our recent training courses.

In these courses the knowledge acquired from years of experience is passed on to your overlookers individually in the form of valuable hints and stimulating suggestions.

More than 400 overlookers attended the courses of our specialist D. Klaesi in Legnano (Italy) where they learnt how to adjust correctly all the different devices with tuning gauges.

RUTI

Ruti Machinery Works Ltd., Ruti-Zurich
formerly Caspar Honegger Switzerland

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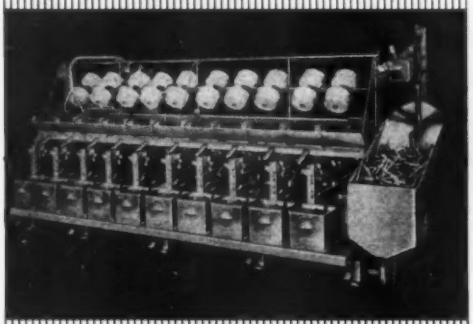
a real help

to loom efficiency



Schärer Textile Machine Works
Erlenbach-Zurich Switzerland

Sole British Agents: G. W. Thornton & Sons Ltd., 10 Eden Place, Cheadle, Cheshire. Tel. : GATley 4271

PROBLEM	
Product	mineral oil emulsion
Throughput	one ton per hour
Power	under 3 h.p.
Location	must be wall-mounted
Labour	only semi-skilled available
Quality control	particle size to be 1 - 3 microns
Budget	under £300

ANSWER

The RAPISONIC homogenizer takes such jobs in its stride. Draw upon specialist experience and get full details of machines for your production now

Ultrasonics
Ltd
Westgate
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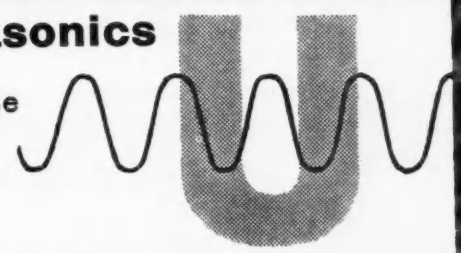
Yorks.



Whoa! For the whole wide range of textile wet-processing you need the extra efficiency of

SHELL TEXTILE DETERGENTS

anionic and non-ionic

SHELL CHEMICAL COMPANY LIMITED. *In association with Petrochemicals Ltd. & Styrene Products*

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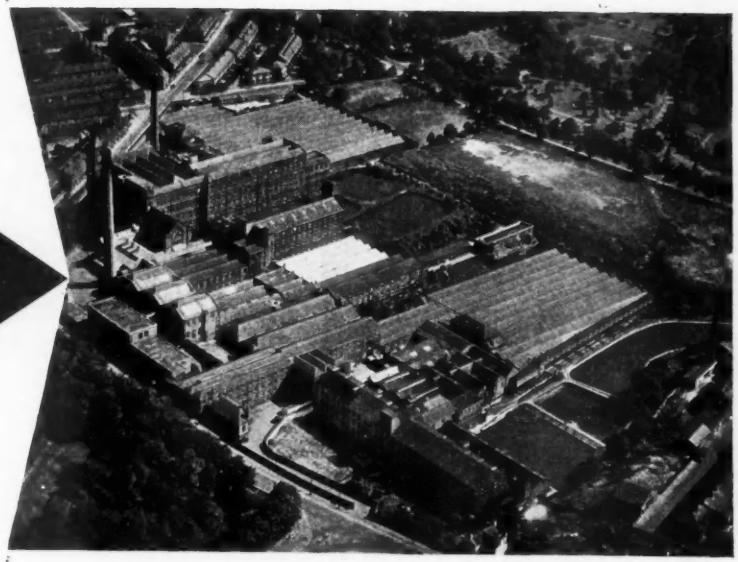
TX2

AIR CONDITIONING 'EVEREST'



From Messrs. Ashton Brothers & Co. Ltd. of Hyde, the famous makers of 'Everest' sheets and Industrial Fabrics, Sea Island Shirtings, 'Zorbit' towels and napkins, comes the following testimonial to Hank Air Conditioning Plant :—

" In our four weaving sheds equipped with central station Hall & Kay plants we have experienced significant increases in weaving shed efficiency, cleaner and brighter working conditions, and freedom from those cloth defects associated with direct injection of water or only partially controlled delivery of humidified air. In our view, well-designed air conditioning equipment is an essential pre-requisite to the installation of modern high capacity equipment . . . "

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AIR CONDITIONING ENGINEERS

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LONDON OFFICE :

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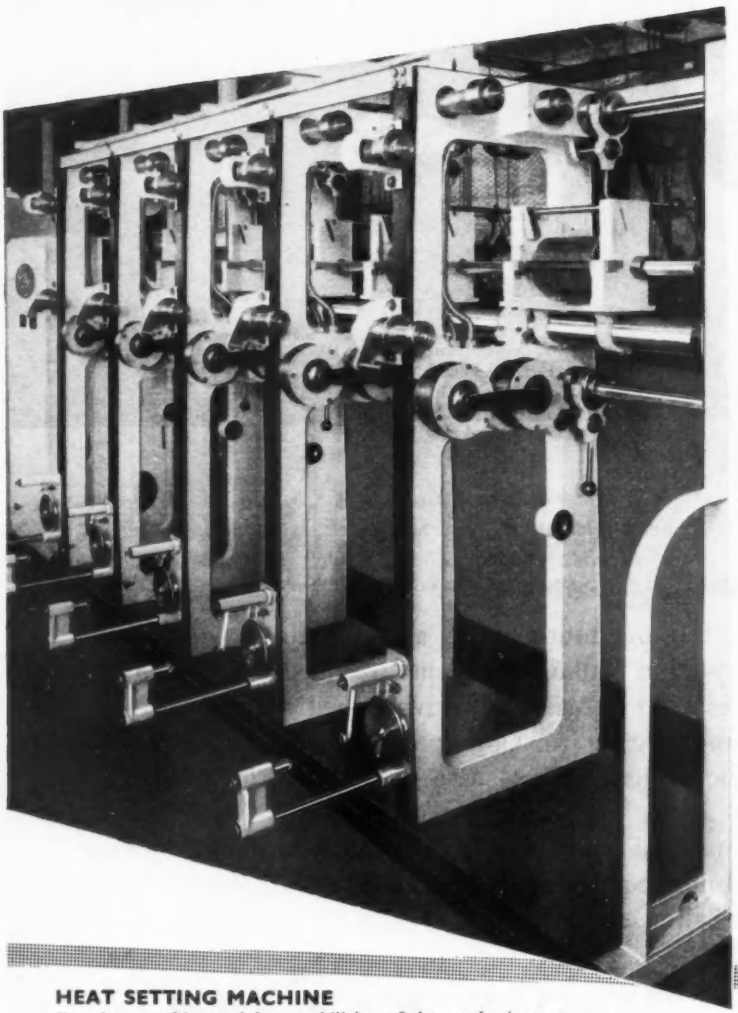
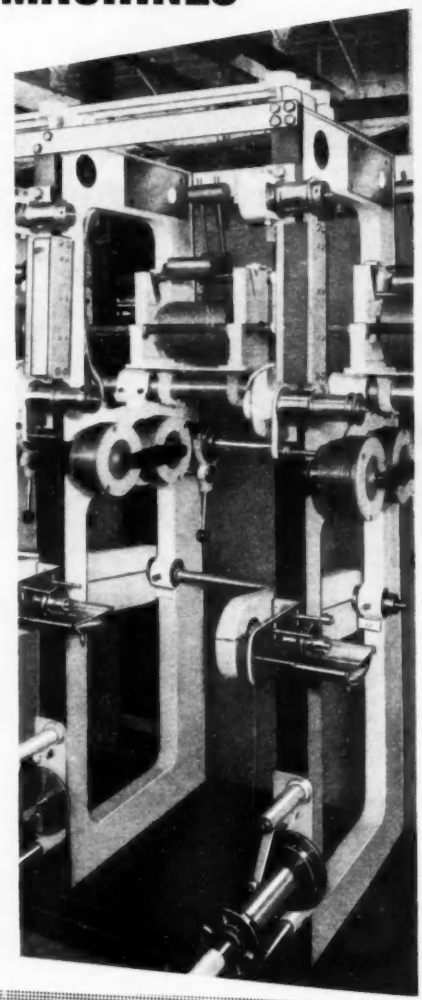
For Thermoplastic, Rayon & Cotton Yarns

the sensational *NEW "John Bright"*

HEAT SETTING & DIPPING MACHINES





HEAT SETTING MACHINE

For the stretching and heat stabilizing of thermoplastic yarns, Nylon, Terylene, Rayon etc. and Cotton either in the continuous form or as a spun yarn, the amount of stretch being variable according to the requirements of the various yarns and their construction. The machine illustrated is designed to operate at 70 yds/min. and at this speed will deal with a range of deniers from 1500 — 4000 and machines have been constructed for considerably heavier deniers. The machine consists of a bank of individually controlled sections not less than ten in number.

DIPPING MACHINE

For the impregnating of cords and yarns with various types of dip solutions, usually of aqueous media, and for the production of low stretch cotton cords.

Write today for illustrated leaflet.

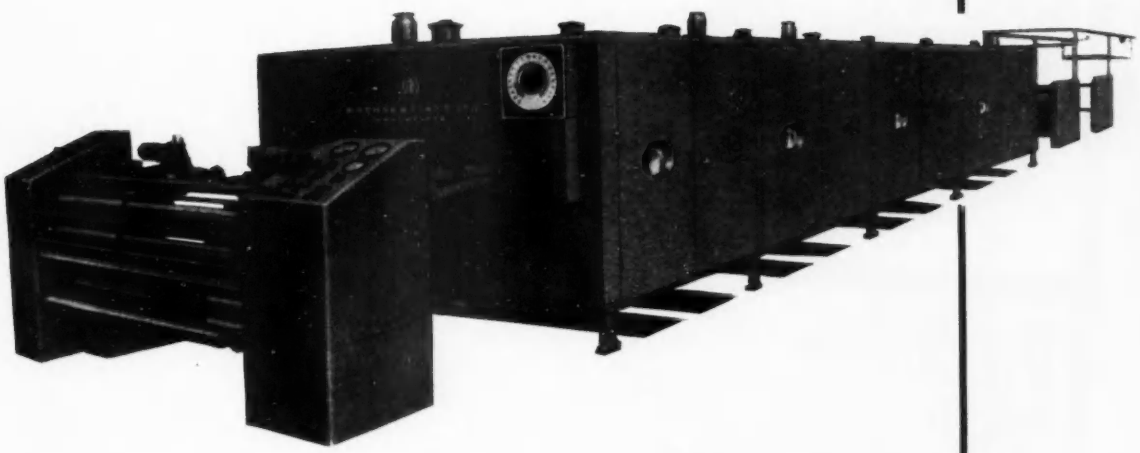
"JOHN BRIGHT" HEAT SETTING & DIPPING MACHINES ARE MANUFACTURED BY:—

T. W. Riley (Rochdale) LTD.

ROCHDALE, LANCS. *PHONE: ROCHDALE 46211/2. GRAMS: 'RAISER' ROCHDALE.*
Under Licence to: **JOHN BRIGHT & BROS. LTD. ROCHDALE, LANCS.**

It's a question of design . . .

For over 150 years we have led the way in original design and development of textile finishing machinery.
Illustrated is one of our latest machines, newly designed to ensure more efficient processing and higher quality of output.



New high-speed setting, baking and finishing stenter for synthetic and man-made fibres. High and easily controlled temperatures by steam, electricity or gas. Very little maintenance.

WE PRODUCE A COMPLETE RANGE OF TEXTILE FINISHING MACHINES—SEE OUR LATEST DESIGNS DURING THE TEXTILE EXHIBITION.

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STURTEVANT VACUUM CLEANING for TEXTILE MILLS

The powerful cleaning action of Sturtevant Vacuum Cleaners removes dust and fly from every structural surface and from many types of machines including automatic looms, tentering machines, selvedging machines, etc.

Every machine in the Sturtevant range is strongly built for long-term arduous cleaning duties—write for further particulars to our reference X/101/V.

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Southern House Cannon Street London E.C.4

AUSTRALIA: STURTEVANT ENGINEERING CO. (AUSTRALASIA) LTD. 400 SUSSEX STREET SYDNEY N.S.W.

Zellweger

USTER

"Little Uster"

Warp Tying Machines

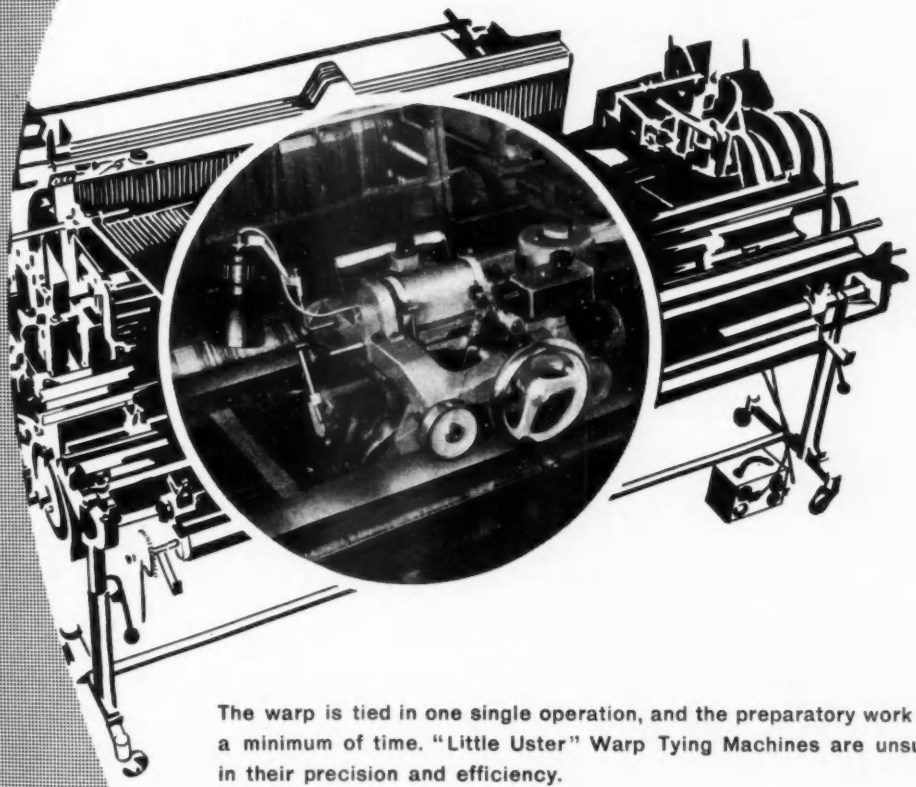
increase the possibility of meeting competition

The "Little Uster" ties...

Up to 120,000 knots in 8 hours

At the loom or as stationary unit away from the loom

Warps with or without a lease



The warp is tied in one single operation, and the preparatory work requires a minimum of time. "Little Uster" Warp Tying Machines are unsurpassed in their precision and efficiency.

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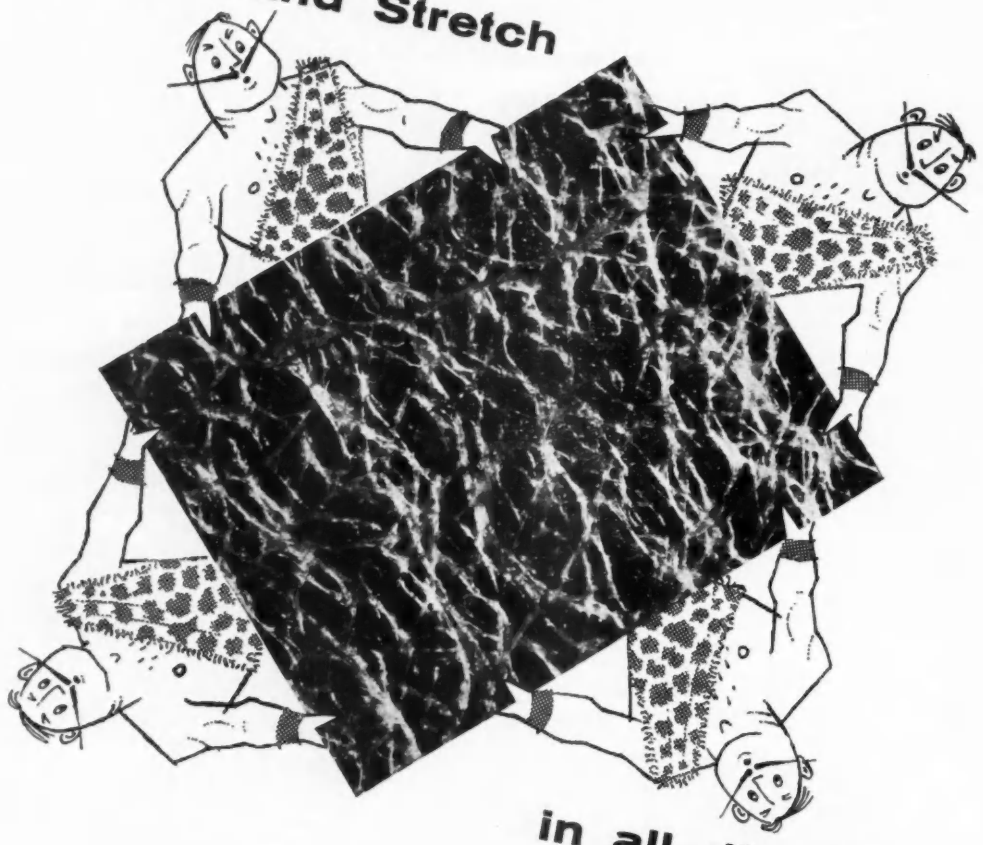
Strength and Stretch



in all directions!

Non-woven fabrics

made with ***Hycar*** latex

The style of a well cut garment, the very shape of fashion, is held gently yet permanently by interlinings made with Hycar latex. Because the fibres are randomly arranged, maximum strength, maximum stretch and a very high stitch strength are enduring features of Hycar-based non-woven fabrics. The absence of warp, weft, bias or selvedge eliminates waste . . . all the fabric can be used. Extremely resilient and crush proof, non-woven fabrics made with Hycar latex wash easily, dry quickly and are not harmed by dry-cleaning solvents. Their smooth, soft surface will not snag even the sheerest nylon.

For further information about Hycar latex, its properties and applications, write for Booklet ***H151***

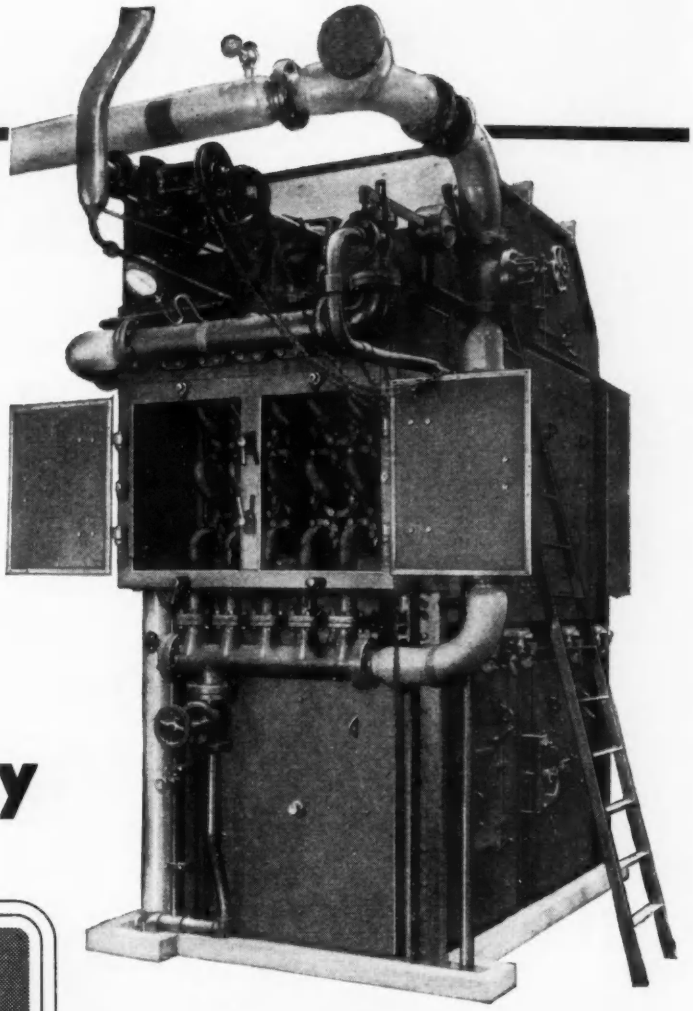
The photomicrograph shows the random arrangement of the fibres, firmly locked in position by Hycar latex.

Hycar is a registered trade mark

British Geon Limited

A MEMBER OF THE DISTILLERS PLASTICS GROUP

SALES AND TECHNICAL SERVICE, DEVONSHIRE HOUSE PICCADILLY LONDON W1 HYDE PARK 7321



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GREEN'S ECONOMISER

Photograph by courtesy of H.P. Sauce Ltd.

Over a hundred years' experience behind it. Thousands of installations with all types of boilers all over the world. Millions of tons of coal saved.

E. GREEN & SON LIMITED · WAKEFIELD

Makers of Economisers for more than One Hundred Years

GE 185

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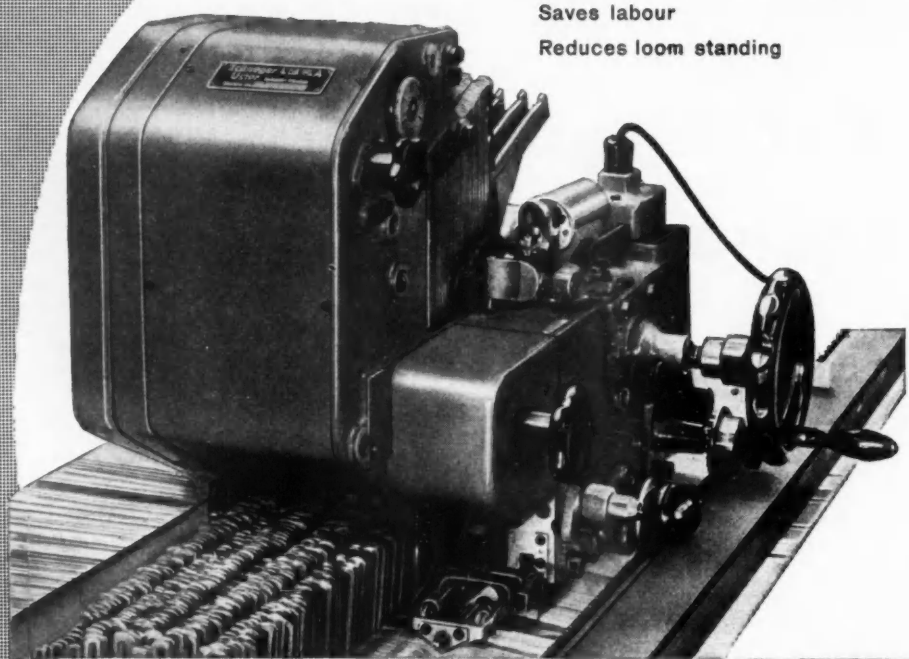
"Uster" Dropper Pinning Machine Reduces Loom Standing Time

Pins up to 300 open ended droppers per minute

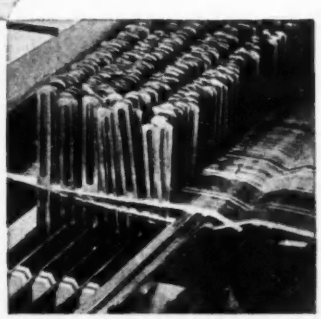
Suitable for pinning at the Loom, or as a stationary unit away from the loom

Saves labour

Reduces loom standing



The droppers are carried in a magazine with a capacity of up to 6,000 droppers, replenishable without stopping the machine. An efficient and experienced staff is maintained in this country for erection, tuition and repairs. A comprehensive Spare Parts Service is at your disposal.



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SUPER J COMBER*

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- Unsurpassed Sliver Quality
- Lowest Maintenance and Operating Costs

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- 8 heads, single side
- Extremely precise construction
- 50% fewer parts than competitive combers
- New spring cushion plate, heavier detaching rolls and weighting, signal lights, lap run-out and knock-off motions
- Unique, simple detaching motion
- Bi-Coil or single sliver
- Unit assemblies

OPERATING FEATURES

- Production 40 lbs. per hour
- Speed 150 nips per minute
- Simple to operate
- Efficiency up to 97%
- Low production cost lb.
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- Simple setting, timing and waste control adjustments
- All heads set identically

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LIVERPOOL : 8a Rumford Place, 3. Tel. : Central 2068

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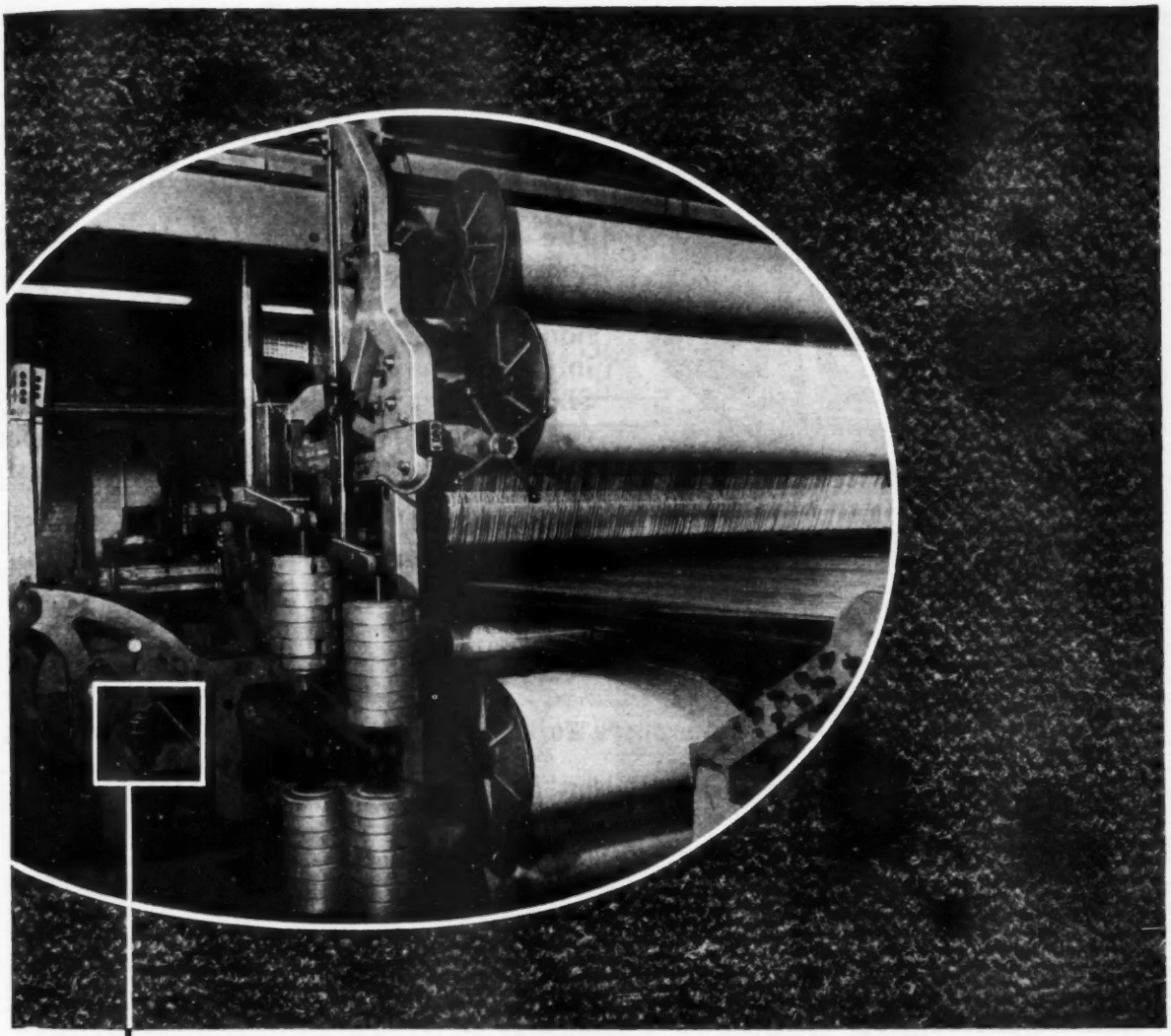

At the works of Messrs. Wilson & Longbottom of Barnsley, this loom weaves Wilton Carpets on the Face-to-Face principle, the pile yarn being cut to separate them. The loom is fitted with a Tecalemit "Bijur" semi-automatic Lubricating System.

NO CHANCE OF OIL SPOTTING

WITH TECALEMIT AUTOMATIC LUBRICATION

Tecalemit Automatic Lubrication has now replaced old-fashioned, messy, oiling methods on many textile machines. On this intricate carpet loom there are 75 oiling points to which oil is metered cleanly and efficiently, by the Tecalemit "Bijur" System. Each point receives at regulated intervals the exact quantity of oil needed.

Every bearing and friction point is maintained at its full efficiency, unproductive stoppages for hand lubrication are unnecessary, and spoilage of valuable carpeting by oil spotting is avoided.

The "Bijur" System — one of several Tecalemit Systems — may be entirely automatic or controlled by a single hand pump. It is particularly suitable for many types of textile machinery.

Our Technical Department will be glad to advise on the type of system most suited to your needs.

TECALEMIT AUTOMATIC LUBRICATION

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The finest Humidifying unit in the world

The automatic Aerosol-Turbo provides completely controlled overall humidity by converting up to 4½ gallons of water per hour into microaerosols, which remain in the air until evaporation takes place. Six models available for 3,000 to 100,000 cubic feet capacities. Guaranteed non-wetting. Precise humidity at low cost.

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Manufacturers of the 'Upblast' Powered Roof Ventilator

WORKING CEILINGS

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For a complete picture of Boiler House conditions

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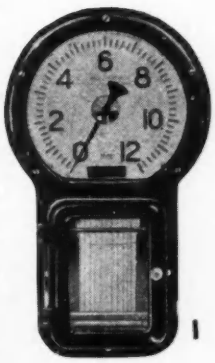
Our technical advisory facilities are at your service.



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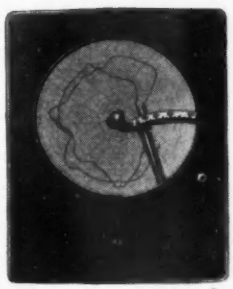
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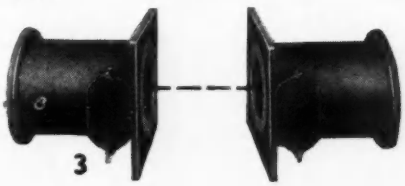
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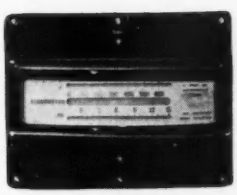
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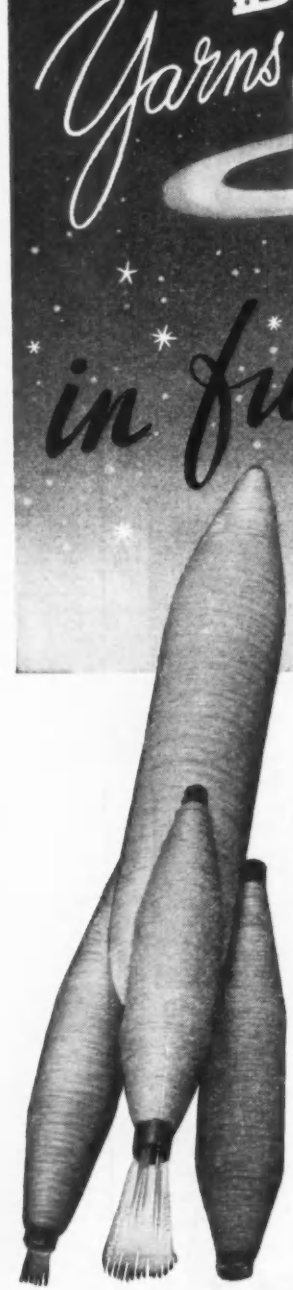

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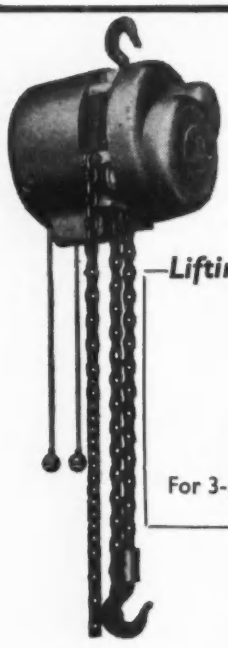

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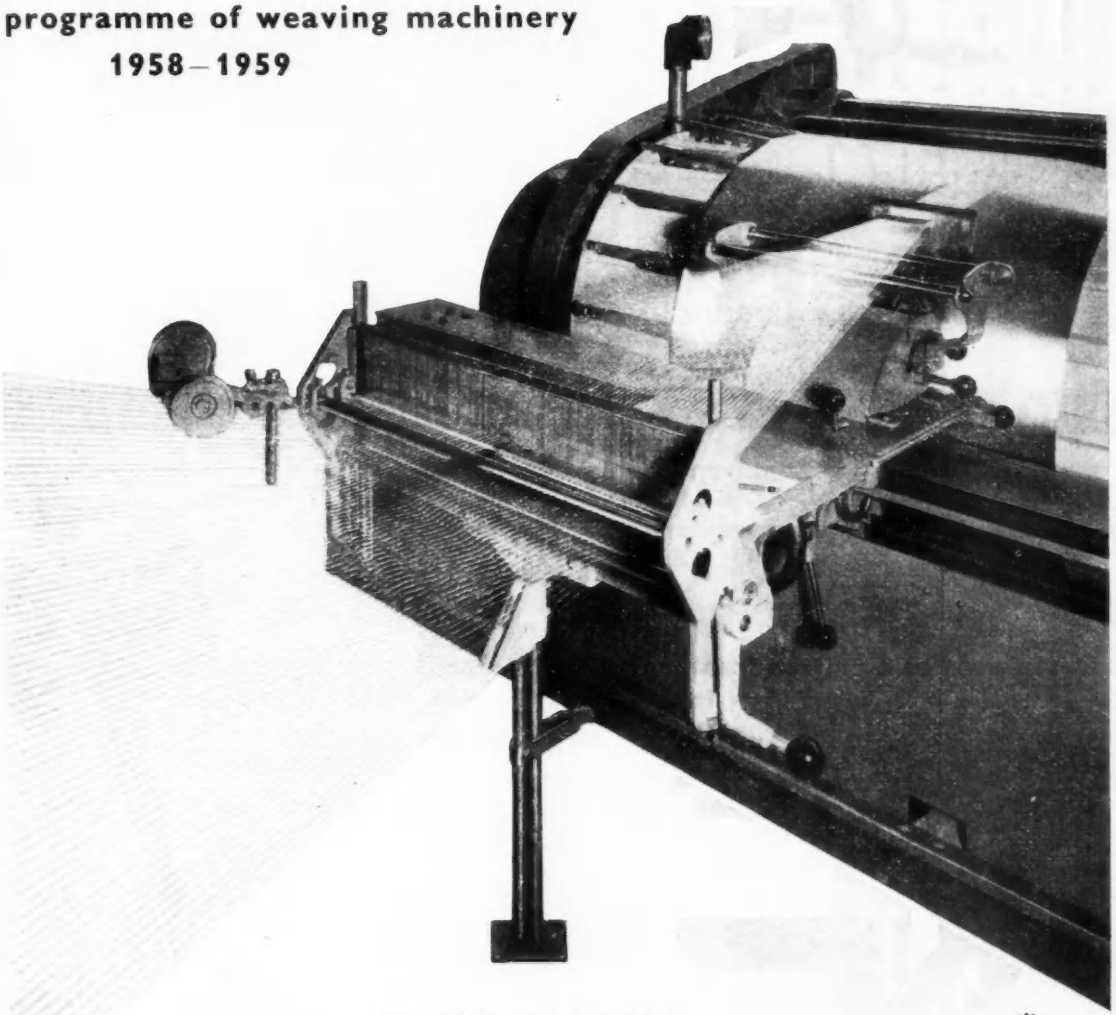

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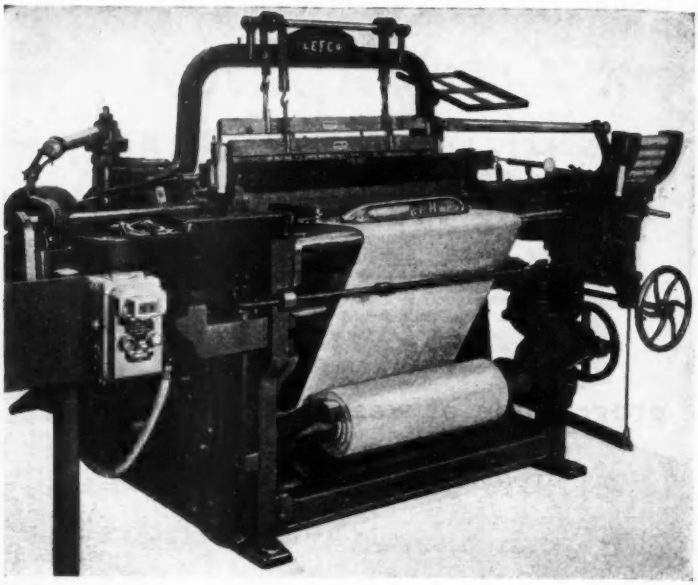

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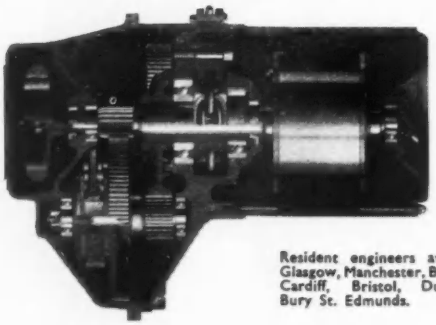

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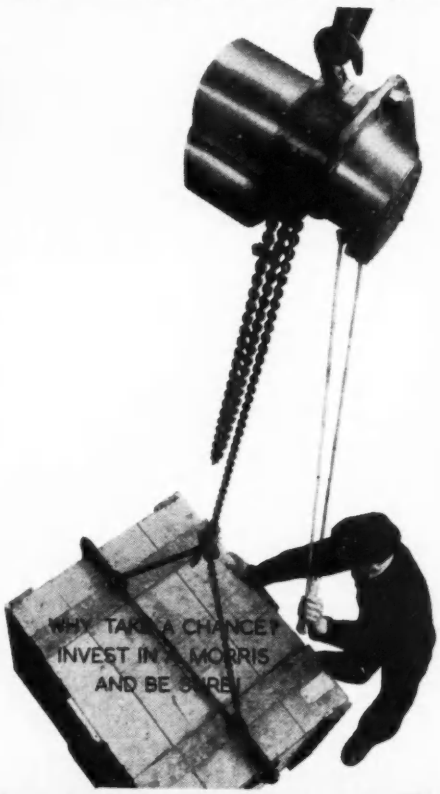

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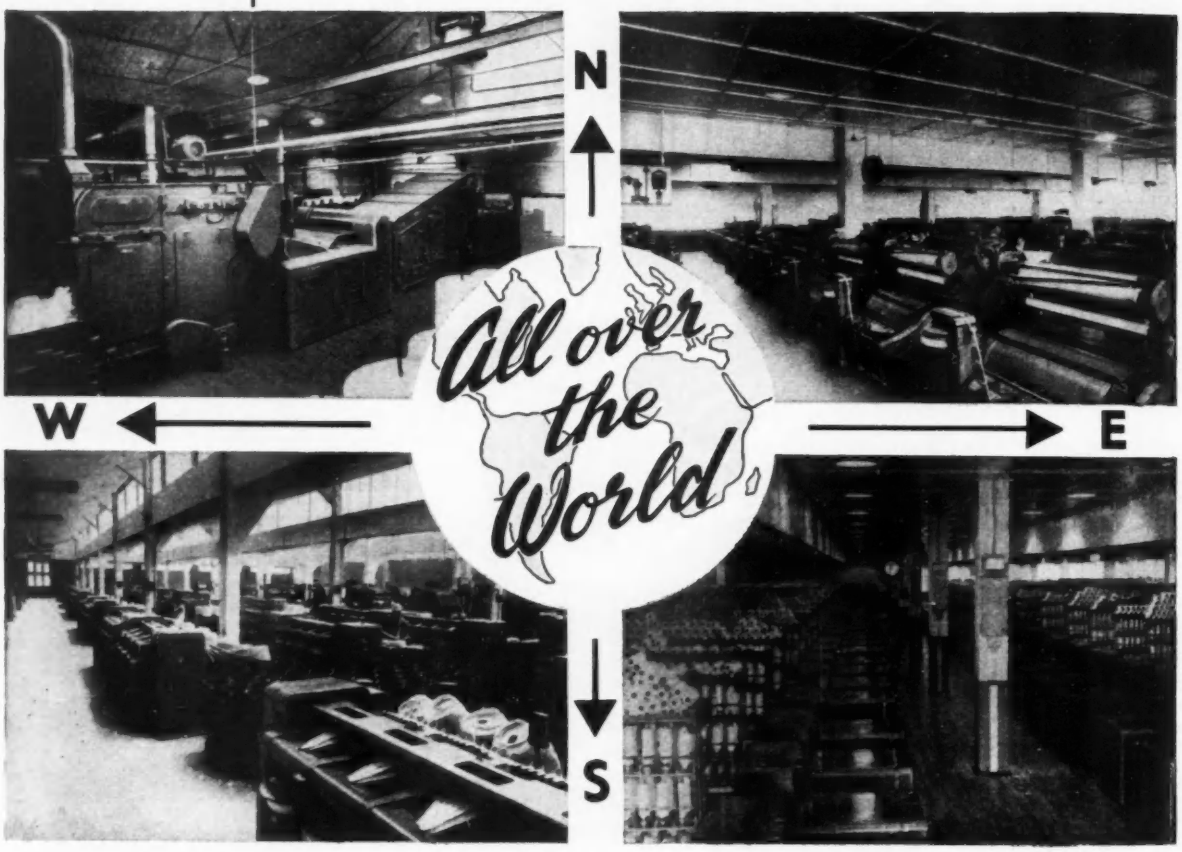

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MATERIALS - PROCESSES - PRODUCTION - MANAGEMENT

NO. 1001. VOL. 84 - MAY 1958 - MONTHLY Two Shillings and Sixpence

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THE TEXTILE MANUFACTURER (*Incorporating* TEXTILE INDUSTRY AND EXPORTER, THE TEXTILE MACHINIST, THE HOSIERY, LACE AND SILK MANUFACTURER, *and* THE TEXTILE COLOURIST) is published on the first Monday of every month.

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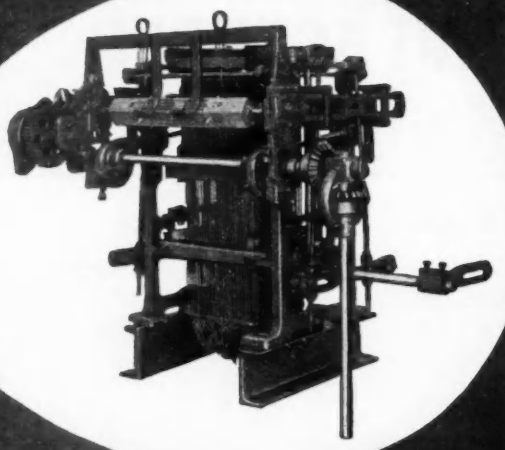

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THE TEXTILE MANUFACTURER

No. 1001. Vol. 84 Two Shillings and Sixpence May, 1958

Notes of the Month

RECORD YEAR FOR CARPET INDUSTRY

BRITAIN'S carpet industry had a record year in 1957, with sales higher in value than ever before. A total of 46,537,000 sq. yds. earned £66,862,000. More carpet was sold in 1954, the total then being 46,900,000 sq. yds., but sales in value were lower. Last year showed a great advance on 1956, both volume and value of sales being 11% up. These are points from the annual report of the Federation of British Carpet Manufacturers, which shows how excellent has been the industry's progress under conditions far from easy. What the Federation describes as "a remarkably successful year" was due mainly to the flourishing state of the home market. Sales in the U.K. reached £58,032,000 compared with £50,780,000 in 1956, and exports for 1957 amounted to £8,830,000, against £8,513,000 in the previous year. "Few people in the trade would have thought this result possible in January or February last year," states the report. "It is difficult to give entirely adequate reasons as to why the public should suddenly buy carpets in greater quantity," it continues. "The most obvious is, of course, the reduction in purchase tax from 30 to 15% in April, and the subsequent increase in sales, compared with the same period in previous years, shows very well the fillip given to the trade. It seems unlikely, though, that this could be the sole reason for the increased activity. Another possibility is that the hire-purchase restrictions introduced by the Government in 1955 and 1956 were beginning to have less effect. Such restrictions tend to delay rather than to prevent purchases."

The industry's joint promotion campaign, carried out through the British Carpets Promotion Council, is also considered to have assisted in increasing sales. "The cumulative effect of the campaign has made the public more carpet conscious than ever before," the Report continues. "There are some who doubt the effectiveness of joint promotion, but a quick glance at the figures of home sales since 1953, when the scheme first started, compared with those of earlier years, is revealing."

	Home Market Sales
1953	£47,510,000
1954	£53,481,000
1955	£54,261,000
1956	£50,780,000
1957	£58,032,000

"Sales have been consistently higher than in earlier years and, except during the recession in 1956, have steadily increased."

In types of carpeting, by far the most significant feature of 1957 was the very substantial increase in Axminster sales, which rose to a new record figure of 31,736,000 sq. yds., representing 68% of total sales. There was a small increase in Wilton sales and larger sales were recorded of hair and hair cord type carpets and carpets of other types. In contrast, there was a further decline in the case of chenilles. The report shows that over the last few years greater use has been made of synthetic and other man-made fibres. The increase in their use, however, is comparatively slow and shows that manufacturers are jealous for the quality of the goods they produce and, until satisfied that this is not being jeopardised, will continue to use wool rather than manufacture goods that may prove unsatisfactory to the public. Wool and worsted still represent almost 90% of the content of yarns used in carpets made by Federation members but as the quality of substitutes improves so will their use increase so long as their cost is lower.

The industry's exports have been considerably hampered by import restrictions and the operation of the credit squeeze in three of its Main Markets—Australia, New Zealand and South Africa—The restrictions introduced in New Zealand for 1958 will be a severe blow. "Were credit and import restrictions to be removed throughout the sterling area in some future time, the industry's export trade should recover substantially and, under such conditions, it is thought might stabilise at about £12 million per annum," adds the Report.

The Federation has been investigating the question of European Free Trade from the point of view of the carpet industry, and a report is now in preparation. "The U.K. is the biggest market in the area and consequently the one most likely to be attacked. It also has the largest industry, being almost equal in size to all the carpet industries in Western Europe, and at the same time it would appear to be the most modernly equipped and most efficient. In general, the investigating team returned with the impression that the British carpet industry had less to fear from its Continental competitors than had at first been thought. It must not be overlooked, though, that the British market is the ripe plum that will appear particularly tasty and desirable to those across the Channel."

Although one or two manufacturers have reported a slowing up in business, trading conditions in 1958 have, so far, proved reasonably satisfactory. Sales by manufacturers of floor-coverings were actually about 14% higher in value during the three months to February, 1958, than in the same period in 1957. But prospects for the remainder of the year are likely to be governed not so much by public demand for carpets as by economic conditions at home and abroad—credit restrictions at home and the possibility of labour unrest in industry generally. In the face of future inflation, import restrictions abroad, the possibilities of the U.S.A. recession intensifying and spreading—all those may adversely affect activity in the industry.

EFFECT OF TECHNOLOGICAL PROGRESS IN THE TEXTILE INDUSTRY ON WORKERS

How technological progress in recent years has affected workers in the textile industry is discussed in a 170-page report which the International Labour Office prepared for its Textile Committee's Sixth Session, which opened at Geneva on April 14. It points out that the textile industry was one of the first industries in which semi-automatic machines were used in the early history of mechanisation, and in many countries these innovations were followed by serious industrial disputes. Recent developments, including the introduction of automatic looms and, to a lesser extent, unorthodox types of shuttleless weaving machines, represent a major change in weaving. There have also been other developments in textile machinery, in technical processes and in the methods of operation. To this must be added the increasing use of man-made fibres, either alone or blended with other natural fibres, which has not only altered the nature of the finished textile products but has also brought many changes in the conventional techniques of spinning. However, certain aspects of automation such as back-feed technology and computer technology have not advanced in the same scale in the textile industry as in some other industries.

The report points out that there are obviously differences of opinion on the exact effects of these developments on the volume of employment and on the conditions of work in the industry. It will be the work of the Committee to examine this question on the basis of the I.L.O. report, which is entitled "Effects of Technological Developments on Wages and on Conditions and Level of Employment in the Textile Industry." The aim of the report is to help the Committee to reach conclusions which, while preserving the undoubtedly beneficial effects of technological developments, will serve also to mitigate some of their unfavourable effects.

It is evident that technological developments do not take place at the same pace everywhere at the same time; they differ from country to country and from mill to mill in the same country. At the end of January last year 35·5% of the 2,795,000 looms throughout the world were automatic. In all countries money wages and real wages rose between 1947 and 1956. These increases reflect higher production which followed progress in techniques. A sample inquiry carried out by the I.L.O. revealed that, in general, there were few specific agreements regarding the distribution of benefits as a result of the introduction of more automatic machines, but that workers who were asked to change their system of work and to go on to new types of machines usually earned more than before and sometimes the benefit was substantial.

Hours of Work and Wages.—Technological developments, by improving productivity, have made possible a progressive reduction of hours of work along with improved wages and living standards. The installation of more automatic machines and therefore more expensive machinery and equipment has, however, necessitated their fuller utilisation so that their increased cost could be spread over a higher output per machine. This has led to increased shift work.

These changes have also generally resulted in better physical working conditions. In addition, they have had a favourable effect on the improvement of the general amenities and conditions of employment inside the factory, including a better climate of human relations both among workers and between workers and management. New machinery and improved methods of work have also affected the general standard and methods of training of workers and influenced managerial attitudes. These aspects have had repercussions on the general conditions of employment.

In most countries the number of workers employed in the textile industry has distinctly decreased or has remained stationary, although production has gone up. In an enterprise where the equipment has been completely modernised the saving in manpower may amount to 50% or more for a specific level of output. In one cotton spinning mill in Japan the number of workers per 10,000 spindles has decreased from 371 in December, 1947 to 93 in December, 1955. In a cotton weaving mill in the same country the number of workers per 100 looms has dropped from 110 in December, 1947 to 30 in December, 1955. Technological progress can, however, cause staff increases that compensate for the reductions made possible by new machinery.

New Finishing Operations.—For example, the improvement in the quality of fabrics, the development of waterproof and uncrushable fabrics or of fabrics given permanent folds, etc., involves the introduction of new finishing operations and enables a larger amount of labour to be employed at that stage of manufacture. If technical progress is, however, not accompanied by a considerable growth of markets, to afford an outlet for much greater production, it is bound to lead to a gradual reduction in the number of workers employed. This seems to have been the trend in the textile industry except in certain countries where development is being actively pursued. When automation is introduced in certain trades it is likely to accelerate this process even more.

There is still one unknown factor, however, namely the increase in consumption which might result from a rise in the standards of living, particularly in the less industrialised countries where the consumption of textiles is very slight, and from population increase in all parts of the world. Dealing with the problem of reabsorbing displaced labour, the I.L.O. report says experience has shown that previous consultation with the workers concerned is an essential prerequisite for the smooth introduction of technological changes. In some countries collective agreements have been concluded with a view to alleviating the hardship of workers replaced because of technological changes, and in protecting the employment opportunities or conditions of employment of the workers retained in the undertaking. It is generally found that, apart from the question of possible redundancy, questions such as the fixing of work loads, the setting of piece-work rates, control over the whole system of wages, and the introduction of time and motion studies require careful handling.

"TEXTILE MANUFACTURER" INDEX

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Further Developments in Large Package Spinning

Larger packages may be made in three ways (a) using a bigger ring or smaller diameter bobbin (b) increasing the diameter of bobbin and ring and (c) by adding height to the bobbin

By N. ROPER, B.SC.(ECON.), A.T.I.

WITHIN the last quarter of a century, the ring spinning frame has become one of the most important machines in spinning mills, having become almost supreme in the sphere of cotton and staple fibre spinning and becoming increasingly popular in the woollen and worsted industries. It owes its growing popularity to its high productivity and efficiency, being simple in both construction and operation. It is also particularly suitable for the building of large packages. In the search for higher productivity spinners are always endeavouring to spin their yarns on to larger packages, but there are inevitable difficulties. The size or capacity of the package may be cinreased in three ways:—

(1) By using a larger ring or a smaller diameter bobbin.
(2) By increasing the diameter of both bobbin and ring in the same proportion.
(3) By adding height to the bobbin.

The first method is unsatisfactory since the winding on angle is decreased in size and this leads to very high spinning tensions, especially at the commencement of a doffing. Increasing both the outer and inner package diameters means wasted space and bigger balloons requiring an increase in spindle pitch. A further disadvantage, so far as ring spinning is concerned is that bigger rings require a lighter traveller and, as the traveller velocity should not exceed 80 ft./sec., larger rings inevitably mean lower spindle speeds.

It appears desirable, therefore, to produce longer packages since there is then no increase in balloon diameter and spindle pitch, and also no difficulties concerning traveller speed. In cap spinning, unfortunately, a longer package means a taller cap, which is both heavier and more expensive. In addition it is necessary to lower the spindle rail further below the yarn guide to allow clearance for the longer cap to be lifted off. Now in cap spinning it has been shown[1] that the balloon tension is proportional to the square of the balloon height, so that small increases in balloon length produce large increases in spinning tension. Large packages in cap spinning are therefore inherently undesirable.

In ring spinning increasing the balloon height has not the same far reaching effects since much of the tension is due to the traveller, but on conventional frames the usual system of fixed spindle rail and moving ring plate brings in too large a variation in balloon height as the lifter moves from the base to the top of the bobbin. This action produces sufficiently large changes in tension as to affect end breakage rate and yarn properties. To counter this effect it is necessary to traverse the spindle rail instead of, or as well as, the ring plate. Textile machinery makers, all over the world, have produced new designs of ring spinning frame with a view to produring larger packages without wide fluctuations in balloon tension. For example, Messrs. McGlynn Hays, in America, produced a novel machine in which the spindle rail was kept stationary, used the ring plate to give the cop build, and provided constant balloon length during the lift by slowly elevating the whole drafting mechanism at an equal speed to the rise of the ring rail.

Theoretical analysis of balloon size, shape and tension has shown that it is possible, under a particular set of end-conditions, to produce balloons of different shapes, e.g. single arc, double arc, "necked" and so on, and that balloons with a necked profile have a smaller tension than the single arc balloon but are, under ordinary conditions, unstable. This suggests that if, by the application of some mild restraint, a balloon with a necked profile could be imposed, then longer packages with normal tensions might well be produced. Thus, on some of the newer types of worsted ring frame, balloon control rings of comparable size to the normal spinning ring have been fitted to large package machines in an endeavour to limit spinning tensions to as low a value as possible. In a fairly recent paper[2] it was concluded from the experimental results obtained that the imposition of

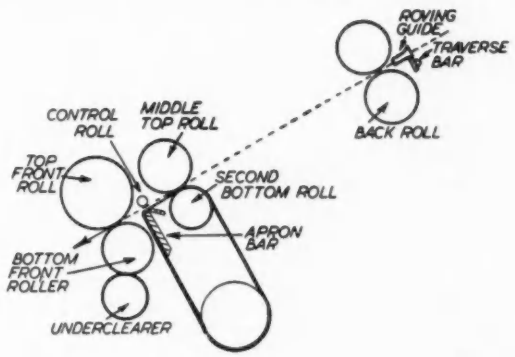

Fig. 1. Saco-Lowell SS-4 draft assembly

controlling rings produced smaller and less variable balloon tensions. Moreover the tension system encountered when spinning normally, can be reproduced at a higher speed level by the application of balloon restraining rings. It would appear that anti-nodal rings produce a similar result to that obtained by employing variable speed motors, but at considerably smaller expense. It is notable, however, that many continental frames have variable speed motors in addition to controlling rings.

Saco-Lowell Ringframe

The Saco-Lowell SS-4 spinning frame consists of a standard spinning chassis, built on a 4 in. gauge mounting the SS-4 drafting assembly, illustrated in detail in Fig. 1. The drafting assembly is mounted on a rollstand, new in design and construction. The front steel bottom roll, 1, and the back steel bottom roll, 3, are fluted and case-hardened. The second steel roll, 2, is sandblasted. These three bottom rolls are mounted in special anti-friction bearings which are lubricated with a long life lubricant protected by adequate seals against leakage or contamination by the infiltration of dust and fly. The front bottom roll, 1, the apron bar, 9, and the second bottom roll, 2, are non-adjustable as regards their spacing. The back roll, 3, together with the traverse bar, 4, and the roving guide, 5, are adjustable and a wide range of settings makes it easy and practical to use that amount of pressure necessary to obtain even drafting with a given stock. The roller pressure can be adjusted so that the pressure on the front and back rolls combined will be from 40 to 200 pounds. A gauge is furnished which enables adjusting the pressure on all rolls to a definite and uniform degree. Once put at a definite degree, the pressure will not change, even when the rolls are removed and again replaced, until a readjustment is necessary due to a change of stock or other operating conditions.

The front bottom roll is $1\frac{1}{2}$ in. dia., the back bottom roll $1\frac{1}{2}$ in. dia. The second bottom roll is normally 1 in. dia on the steel, but 1·05 in. over the apron. A distinctive feature of this roll, however, lies in the design of that portion which is under the larger $1\frac{1}{4}$ in., top roll, as the roll is constructed to obtain a broad and yielding control over the fibres. The result of this construction relieves the fibres passing through this zone of any definite bite, although retaining a certain degree of inter-fibre friction, a condition which sets up and maintains a smoothing or grooming action in this particular area. The pressure required to keep the middle top roll in contact with the driving portion of the second bottom roll is developed by separate springs with a fixed pressure.

While roll settings are not over critical with the SS-4 drafting assembly, the ratch adjustment is important. It has been found helpful to set the back roller so that the spread between the front roll and back roll nips is slightly less than the length of the longest fibres in the stock. As a result of the strong roll pressure and the setting of the rolls within this staple length, the drafting is accomplished in such a manner as to produce a more even distribution of the fibres within the strand and, consequently, makes possible the spinning of a very even yarn.

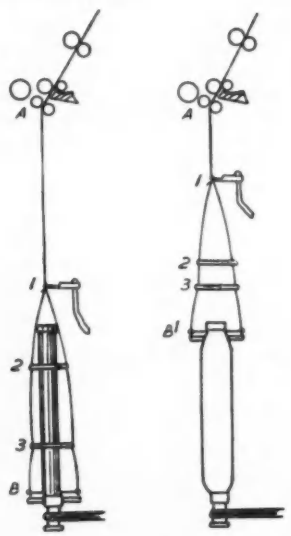

Fig. 2. Saco-Lowell SS-4G spinning frame

The SS-4G System

The SS-4G spinning frame consists of a standard Gwaltney chassis mounted a modified SS-4 drafting element. All the gears of the Gwaltney chassis are mounted on anti-friction bearings in order to reduce maintenance and lubrication to the very lowest limit. The efficient SS-4G drafting element in connection with the Gwaltney system of balloon control, illustrated in Fig. 2, makes it possible to produce yarns of excellent quality from all kinds of blends.

Basically, the SS-4G drafting assembly consists of a 45° roll stand carrying three bottom rollers and an apron bar. The front roll is 1·375 in. or $1\frac{15}{16}$ in. dia. and case-hardened. The middle roll is 1 in. dia., and the back roll 1·125 in. All the rolls, as well as the apron bar, are independently adjustable with reference to each other, thus a greater degree of flexibility is obtained which enables this frame to be adapted to almost any type of fibre. All of the component parts of the drafting assembly can be put in the most advantageous position for obtaining the maximum degree of fibre control at the critical point in the final drafting zone. The SS-4G assembly can be operated with drafts up to 25 and is capable of spinning blends with the staple length ranging from a minimum of 2 in. to a maximum of 7·5 in.

Operation of the Anti-Node Rings

The Saco-Lowell frame employs the Gwaltney principle of two balloon controlling rings of comparable size to the spinning ring. Ring 1 is a small diameter pig-tail; ring 2 is nearly as large as the spinning ring, while ring 3 is lightly larger than the spinning ring, B and B^1. The spinning ring is traversed through a distance of $11\frac{1}{4}$ in., and rings 1 and 2 move, together, a distance less than this traverse. Ring 3 moves through the same traverse as the spinning ring. Fig. 2 shows two positions of the ring rail and the rings 1, 2 and 3.

The "stretch" from A to B and A to B^1 creates an equalization of twist. The balloon, which is completely controlled by the restraining action of the anti-nodal rings, develops a reduction in tension which is nearly uniform throughout the bobbin building cycle. This makes it possible to increase traveller speed from 25% to 50%. The Saco-Lowell F.5 roving and the Gwaltney spinning frame are now being manufactured in this country by J. and T. Boyd Ltd., Glasgow.

Whitin Superflex Frame

Paralleling the improvements made on the quick-set roving frame ("T.M.," Nov. 1957, p.549), Messrs. Whitin provide an improved new model spinning frame for manufacturing yarns on the Whitin American System. These new developments include a highly satisfactory method of top roll suspension, weight distribution and control, quick-set ratch adjustments, and an optional balloon control ring. The latest and well tested Whitin two apron American long draft system is employed. The drafting assemblies are mounted on the roller beam of the Whitin Superflex spinning frame

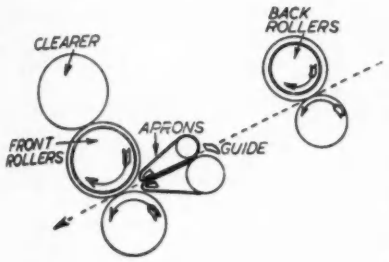

Fig. 3. Whitin long-draft system

which has a long traverse builder motion for large package spinning. The drafting elements can also be mounted on the chassis of the shorter traverse Whitin F.2 spinning frame.

A feature of the new top roller arm design that is of great practical value is that the weight on all 3 lines of top rolls can be adjusted individually by simply turning Allen set screws conveniently located above the top rolls. In addition, each line of rolls has a scale indicating in pounds the exact weight on the top rolls. This arrangement not only ensures the use of uniform weighting on all the rolls of the frame and the correct weighting on all of the frames, but permits instantaneous checking by the supervisory staff of the weighting. This simple, accurate weighting control mechanism eliminates what was formerly a lengthy, costly, maintenance and operating problem and has an important effect in producing even, high quality yarn.

A simple, efficient, accurate ratch control mechanism is available with the new top weighting arrangement. It is similar in design to the instant ratch mechanism on the quick-set roving frame. By using a special handle, the rolls can be spread to their maximum distance of 9½ in., any intermediate position, or brought to their closest setting. Once set, the ratch is firmly held. Use of one special handle prevents unauthorised change of roll spread by the operators. The flexibility and accuracy of this new ratch control has the great advantage of allowing instant determination of optimum ratch settings for maximum quality.

The double apron long draft system (Fig. 3) has proved its effective fibre control powers in the high quality of yarn produced. The accurate control of both long and short fibres simultaneously is achieved by the use of a recessed knurled middle top apron roller. This allows slippage of the longer fibres, avoiding the possibility of their breaking, yet retaining a firm grip on the shorter fibres with the two aprons. Its flexibility and range is shown by the fact that this drafting system will perform successfully on fibres varying in effective length from 2½ in. to 8¾ in., with appropriate ratch settings. The actual draft employed depends, of course, on the type of material and the mill organisation, but the recommended drafts range from 8 up to 20.

The new Whitin American Superflex spinning frame has a maximum bobbin traverse of 11 in., and can easily be adjusted to accommodate lesser traverses down to 8 in. Rings can be supplied in sizes from 1½ in., to 3½ in., or larger, depending on the pitch of the frame, which is normally 4 in., or 4½ in. A traversing balloon control ring for each spindle is available as optional equipment, where its use may be advantageous in special circumstances. The position of the balloon control ring at approximately half the traverse is adjustable, and it can be easily lowered to a position near the bottom of the traverse to facilitate doffing. When it is required, the balloon control ring permits the use of lighter travellers, is beneficial in reducing the number of ends down, and improves operating conditions.

Perfect Worsted Ringframe

The Perfect worsted ring spinning frame, made by Spinnbau, Bremen-Farge, Germany, incorporates several new and revolutionary developments in spinning frame construction (see Fig. 4) and the following advantages are claimed.

(1) The spindles are positively driven by helical gears ensuring uniformity of speed and a long lasting run instead of tape or band driven spindles. Thus the elimination of tin rollers, jockey pulleys and tapes means minimum air turbulence and no standing time for sewing and/or mounting of tapes, attendance to jockey pulleys, washing and re-adjustment of spindles, etc.

(2) Compensation of thread tension as a consequence of the constant balloon length, a feature which is further considerably improved by the use of ante-ballooning rings.

(3) Greater uniformity of twist thanks to the positive spindle drive and a more uniform distribution of twist over the whole doff due to a constant balloon height.

(4) Precise fibre control and high draft performance ensured by the well approved broad belt drafting system.

(5) Low power consumption due to a lavish use of anti-friction bearings.

(6) Reduced oil consumption as a result of pressure feed or centralised lubrication—the lubrication can be affected while the machine is running so that considerable time savings result. Cleaning can also be effected during running time.

(7) Aspiration of fly waste so that thanks to an always clean front roller no fly will be drawn along and spun into the yarn.

(8) Complete synchronisation between drafting system and spindles by the use of first-class gear sets.

The Perfect worsted ring spinning frame is supplied with a high drafting system (Fig. 5) equipped with broad belts made of long-lasting synthetic rubber. The broad belts ensure a safe fibre control and contribute to the elimination of static electricity. Since

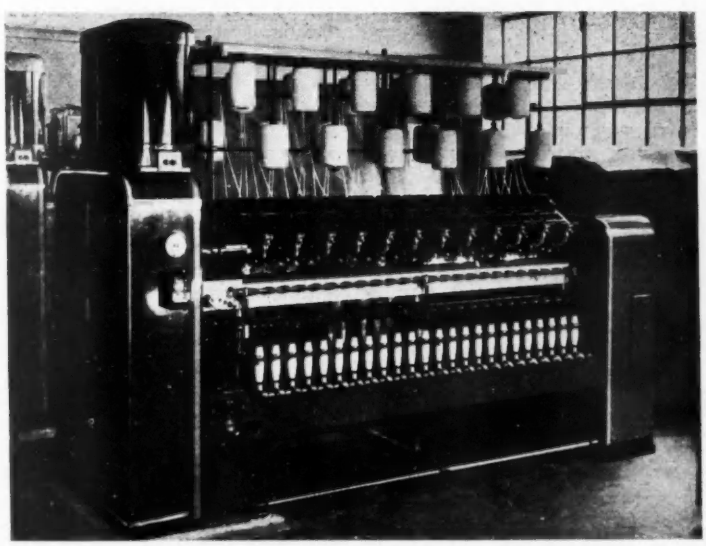

Fig. 4. The "Perfect" ringframe (courtesy Messrs. Spinnbau)

each individual belt always covers the distance between two roller stands, drawbacks of the hitherto usual small aprons such as variations in their speed, the necessity for guide and tension arrangements as well as open spaces tending to accumulate dirt or form laps are avoided.

The rovings on the broad belt are controlled by intermediate rollers, the number, setting and weight of which can be varied according to the particular requirements of the sliver and the amount of draft applied. The pressure between the intermediate rollers and the apron is more effective in restraining the forward movement of the short fibres than when rollers alone are employed and higher drafts

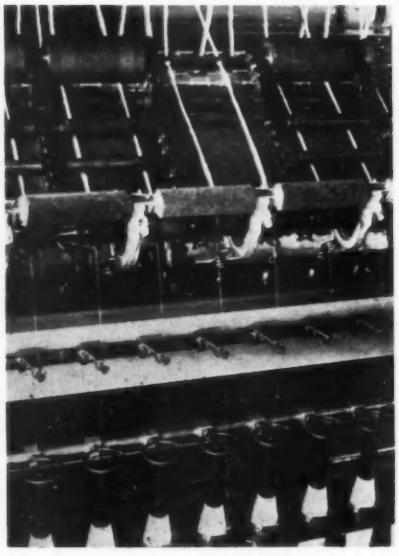

Fig. 5. "Perfect" high draft system

can be imposed with no reduction in uniformity of the spun thread. Since the drive, guide and supporting elements for the broad belt, which extends for the whole reach of the drafting system, are located in the interior all those parts are under cover. This contributes towards obtaining a clear arrangement of the whole drafting system.

Should an end break after leaving the drafting system it will be removed by a broken end suction device Type LTG and conveyed to the filter box at the off-end of the machine. The suction tube of each spindle is hinged to allow of piecing up broken ends in the usual way. The particular shape of the aspiration tube is such as to direct the draught also against the delivery roller in order to maintain its cleanliness in the spinning zone. Collecting ducts on each side of the machine convey the fibre to a filter box having a separate compartment for each to keep the fibre stock of both sides apart.

The frame may be driven in two different ways—by pole—changing squirrel cage motors or by variable speed motors Type SSW. With the pole changing squirrel cage motor a totality of 40 different spindle speeds ranging from 2,100 to 8,000 r.p.m. can be attained. If a speed of 8,000 r.p.m. or more is required or if an infinite regulation of the spindle speed is preferred the Perfect frame is supplied with two variable speed SSW motors mounted in the headstock. This drive allows of spindle speeds between 3,300 and 10,500 r.p.m. and offers the advantage that the output of the frame can be increased up to the utmost limit, particularly in combination with anti-ballooning rings. Spindles are provided for running both ways and a simple turn of a lever by means of a special wrench will suffice for changing the direction without requiring any more changes. This device is supplied with a safety lock so that nobody can tamper with it.

Anti-snarl Clutch

In the case of highly twisted yarn and particularly as a consequence of the improvements applied to the smooth surfaces of spinning rings there will arise the danger that snarls may form when the frame is stopped. Such snarls will be removed on re-starting the frame by means of a particular clutch coupling provided at the gear box for the drive of the drafting system. This clutch will take care that the delivery roller is stopped for a moment and no yarn will be delivered although the spindles may already have begun to rotate so that the snarls will disentangle. After half a turn or a complete turn, which can be adjusted beforehand, the clutch will automatically engage. If this interruption should not be sufficient for removing the snarls the clutch may be withheld by hand for any desired length of time.

Anti-ballooning Rings

There is nothing new about using rings for reducing the balloon. However, in the case of the Perfect ring frames with their constant thread balloon resulting from the stationary ring rail the anti-ballooning rings are having a particular importance in comparison with ringframes with movable ring rail and variable thread balloon (Fig. 6).

Since the position of the balloon with regard to the anti-ballooning rings does not vary, conditions for thread tension will always remain the same, a fact which of course, will exert a favourable influence over the whole spinning performance. Thanks to the reduced thread tension obtained as a consequence of the anti-ballooning rings, it will be possible to spin at the same spindle speed with a traveller two grades lighter. The use of this light traveller will subsequently allow of higher spindle speeds and an improved output.

The Perfect anti-ballooning ring is

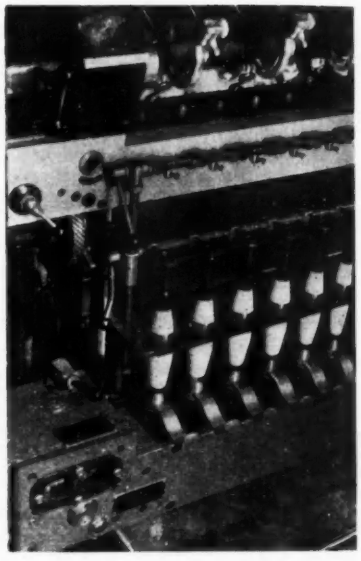

Fig. 6. "Perfect" winding-on arrangement

of closed shape and has a leading-in-slot, which may be turned so that the incline of the slot will always be in conformity with the direction in which the spindles rotate. In such a way any ends outside the ring will be automatically led in through the slot. This will facilitate operations when new bobbins are to be started or broken ends pieced up. The ingenious design of the anti-ballooning ring assures a satisfactory run of the yarn within the ring and avoiding any interference with the yarn by the slot. While winding the cop base the anti-balloooning ring will be lowered into a more favourable position and will follow the up and down movement of the spindle rail until the cop base is completed. In a similar way, in order to facilitate the doffing of full bobbins, the anti-ballooning ring will be lifted

up by means of pokers which are pushed upwards by the rising spindle rail.

Schlumberger Ringframe

The new Schlumberger worsted ringframe, Model CF22L has drawn the attention of worsted spinners by the quality of its work, its production and its simplicity and ease of operation and maintenance. Both sides of the frame are independently driven either by constant speed motors or by variable speed motors. In the former case, the motors are placed either on the ground or upon the filtering case of the suction device; in the latter case, the motors lie on the ground in front of the main headstock. The spindle pitch is $3\frac{17}{32}$ in., with a standard number of spindles of 400. Ring diameters may be $2\frac{1}{4}$ in.–$2\frac{7}{8}$ in. or $2\frac{9}{16}$ in. The lifter motion will accommodate tubes from $9\frac{7}{8}$ in.–$10\frac{7}{1\frac{7}{2}}$ in.

The drafting device (Fig. 7) consists of a broad apron for two threads with metal tumblers controlling the fibres, the whole removable in a single hold even while the frame is running. The depth of the drafting field is $10\frac{5}{8}$ in. and caps with multiple notches allow the tumbler settings to be varied in a manner best suited to the material being processed. The linear speed of the apron is very uniform owing to the careful selection of size, weight and position of the different parts. In case of laps on the front roller, the front apron guiding roller will give way upwards, thus preventing any breakage or deformation. A pneumatic pressure device (licence J. J. Rieter) ensures even pressure on the top front rollers. Pressure is obtained by means of a handpump and controlled by a manometer on each side. The top rollers, covered with synthetic rubber, have individual pressure release.

Groups of four spindles on the same side are driven by means of pulleys cast in light alloy, tension and guide rollers and tapes. This drive may be reversed without any alteration of the tape disposition, only by insertion of an intermediate pinion and altering the rotation sense of the motors. The frame is also equipped with a suction device for broken ends, a balloon control ring, self-lubricating conical rings, and reciprocating lappets. The draft and twist gearing is very simple and the interchangeable gears enable a range of drafts from 5–30 and a range of twists from 1·5 to 36 turns per inch to be obtained. Smooth and silent running is obtained by the use of celoron inclined teeth gears.

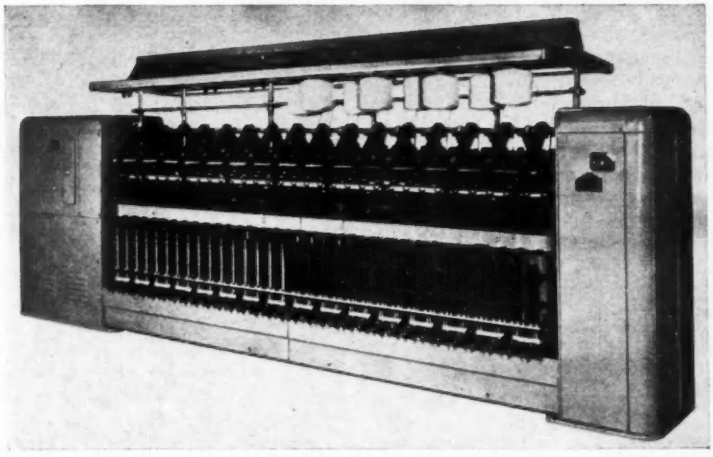

Fig. 8. "Magnaspin" ringframe (courtesy, Fairbairn, Lawson, Combe Barbour Ltd.

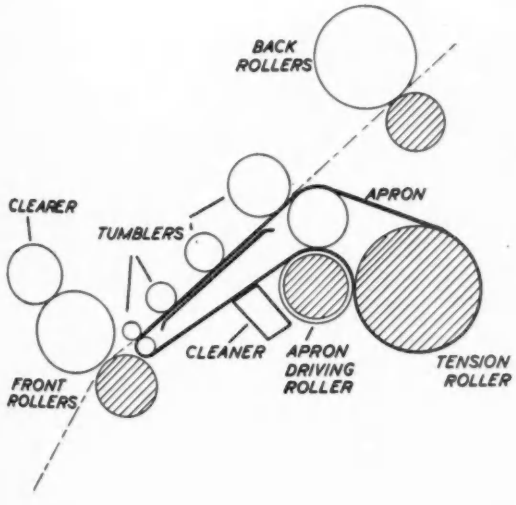

Fig. 7. Schlumberger high draft device

Magnaspin Ringframe

In recent years Fairbairn Lawson Combe Barbour Ltd. Leeds, have introduced a large package ring spinning frame for worsted and synthetic yarns. This machine, the "Magnaspin" (Fig. 8), has great flexibility because it has been created to handle, with quickly made simple adjustments all types of roving from Bradford, French or Anglo-Continental systems or new drawing systems of the American type. Furthermore, it has been designed to handle roving from any system of drawing likely to be used in the foreseeable future and for all types of synthetic fibre.

The "Magnaspin" was designed around a very large spinning package, with a capacity of from 12 ozs. of soft twisted hosiery yarns to 17 ozs. of synthetic fibre yarns. The lift of the machine is 12 in. and the ring diameter 3 in. It has been found that this ring diameter is suitable for worsted hosiery yarns up to 32s. Above this count the spinning speed has to be reduced slightly when a 3 in. ring is used and a $2\frac{3}{4}$ in. ring is normally suggested to enable high spinning speeds to be maintained.

The very large package referred to above has been obtained by the use of balloon control. Two balloon control rings are fitted. These limit the diameter of the balloon for a given tension. The lower balloon control ring, which is carried by the ring rail, is in a fixed position relative to the spinning ring. This means that the angle of approach of the yarn to the traveller is constant; the variation in this angle caused by the alteration in

balloon length on an ordinary ring-frame of the roving ring-rail type causes variation in traveller friction and thus in yarn tension. The arrangement of balloon control on the "Magnaspin" also means that a large variety of counts can be successfully spun on the same machine. The extreme size of the package means that this not only is a practical proposition, but also a fully economic one. The count range is as follows—

Worsted yarns—Continental, Bradford or American.

(1) Hosiery. Up to 32s on 3 in. ring. Up to 40s on 2¾ in. ring.

(2) Weaving yarns. Up to 40s. on 3 in. ring.

(3) Synthetic fibre yarns. (Long staple.) Up to any commercial count on 3 in. rings.

The drafting system (Fig. 9) comprises a reinforced synthetic rubber apron of the broad type with control rollers resting on it. These rollers are of different weights, and have different

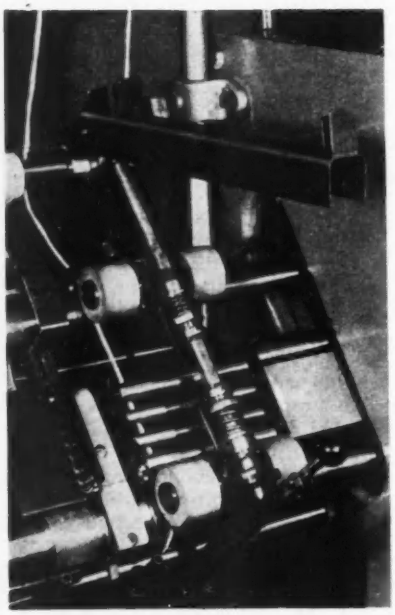

Fig. 9. "Magnaspin" draft unit, showing pressure arm in operative position, but with cover raised to permit pressure adjustment

surface finishes, depending on the material being spun. A number of alternative control-roller positions enables the draft control to be simply and quickly adjusted to suit the roving under treatment. The aprons may be removed without disturbing their driving roller so that in the event of an apron's needing renewal, it can be replaced without recourse to gluing up. The nip is very short, ensuring close control of short fibres; and when twistless roving is spun floating condensers are fitted.

For normal purposes the following drafts can be used—

(1) Continental roving—up to 16.

(2) Twisted Roving: (*a*) single—up to 12 and (*b*) double—up to 22. (In certain circumstances, single roving drafts up to 20 may be used.)

Various types of drive are available. For high twist and synthetic fibre yarns the frame is usually supplied with a squirrel cage motor and change pulleys. As an optional extra a variable-speed pulley coupled to the motor base plate may be fitted, so that speed changes can be made by turning a handle. A spindle speed tachometer is normally supplied with this type of drive. When low twist worsted yarns are spun it has been found advantageous to use a similar drive, but fitted with automatic operation, so that the machine starts and runs, for approximately the first 15% of the doffing cycle at a rather lower speed. This type of drive retains the advantage of ease of alteration in overall spinning speed. Whatever type of drive is fitted to the machine, standard equipment includes a solenoid brake, and a centrifugal clutch for gentle starting.

Worsted yarns are normally spun at speeds between 6,000 and 7,000 r.p.m. Synthetic fibre yarns are normally subject to no speed limitation save that of front roller speeds on coarse counts; this applies, of course, to all materials. The maximum operating speed of the machine is 7,000 r.p.m.

(To be continued)

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2. G. M. Bracewell and K. Greenhalgh. J.T.I. 1954. 45 T.730.

F.N.F. Machinery Manufacturing Co. Ltd.

An agreement has been concluded between Courtaulds Ltd. and Hobourn Aero Components Ltd., whereby Hobourn will acquire a substantial shareholding in F.N.F. Machinery Manufacturing Co. Ltd., Burton-on-Trent, a subsidiary of Courtaulds. F.N.F. (manufacturers of the famous F.N.F. high-speed warp knitter) will continue the production, development and sale of these machines and other textile machinery. All maintenance services, including spares and components, will continue unchanged in the U.K. and overseas.

Procion Rubine B

This new homogeneous reactive dyestuff is an important extension to I.C.I. Dyestuffs Division's firmly established Procion range. An outstanding feature is said to be its ability to produce shades of high light fastness on cellulosic fibres, the dyeings also possessing high wash fastness and (in the case of cotton) good chemical fastness. The high light fastness on viscose rayon is claimed to be virtually undiminished by any of the usual resin finishes.

Procion Rubine B is of special interest as a basis for fast-to-light pinks, bluish reds and bordeaux shades, and generally as the red component in mixtures. A wide range of fast-to-light mode shades, suitable for all three types of resin finishing, is obtained from Procion Rubine B in combination with Procion Yellow R and Procion Brilliant Blue R. The new dye is applicable to cellulosic fibres by all the established methods for Procions, continuous or batchwise. In textile printing applications, Procion Rubine B is notable for its rapid fixation, by non-steam as well as by steaming processes, and prints of very good light and wet fastness are produced.

New Designs in Dress Fabrics

The patterns reproduced on the facing page are a few selected from the spring '59 dress range of Tootal Broadhurst Lee Co. Ltd., 56 Oxford Street, Manchester 1. Brief details are as follows:—

(1) "Daflo," a blend of cotton, wool and "Ardil" protein fibre, coloured woven in a 2 and 2 twill. It has a warm handle and is suitable for children's wear, men's sport shirts and pyjamas, and women's blouses.

(2, 3 and 4) These are dress poplins, coloured woven mercerised and marked "Tebilized" for tested crease-resistance. It has a crisp handle and is suitable for lightweight blouse and dress wear. The satin stripe in (2) makes an interesting decoration.

(5 and 6) "Tootress" is 100% spun viscose rayon, in a dobby weave, available in printed designs and plain dyed shades. It is marked "Tebilized" double tested for crease-resistance and minimum-ironing. The woven background effects give the cloths character and interest and it is an excellent medium weight dress fabric.

(7, 8 and 9) "Sun Cotton" is woven from high grade American cotton in a plain weave with dobby interlacings, giving a "strawcloth" effect. Marked "Tebilized" double tested, it is available in both prints and plain dyed shades. It is an "out-door" fabric suited to skirts, playsuits, and beachwear, etc.

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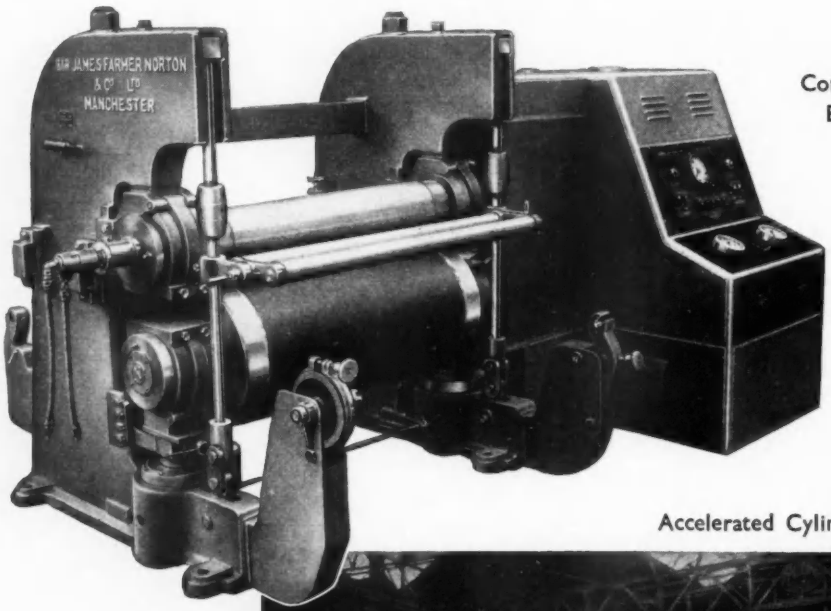
New Designs
in
Dress Fabrics



Combined Glazing and Embossing Calender

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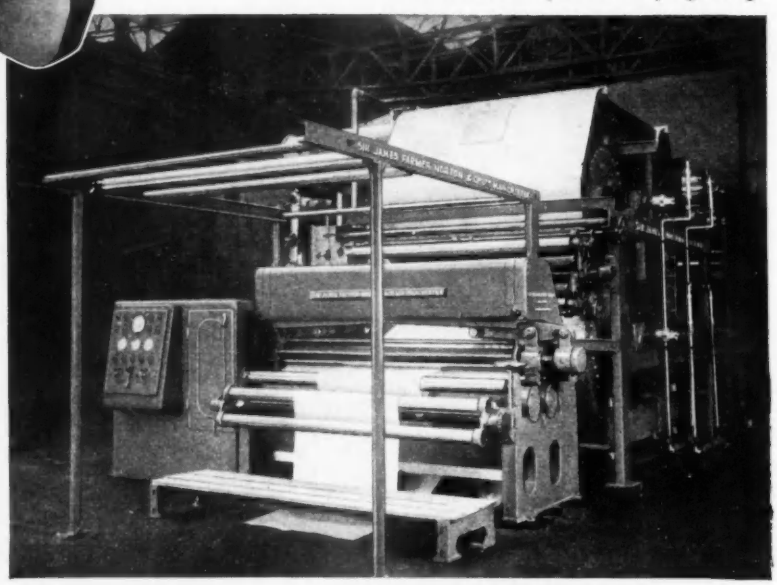

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Sizing Nylon Yarn

Abstracts from two of the papers given at a recent one-day conference entitled "Preparation of Yarns for Knitting" appeared in "T.M.", April, pp. 191 - 2, and abstracts from the remaining papers are given below

WHEN the commercial possibilities of nylon 6·6 were first investigated, research had shown that an application of gum greatly improved the performance of the yarn. This was because the yarn was temporarily monofilised and protection was given to the individual filaments during the knitting process and many subsequent handling operations, said Mr. G. Sheppard (Technical Development Department, British Nylon Spinners Ltd.) in his address to the conference. Great technical strides had taken place since then, he continued, both in yarn production and knitting practice, and a significant milestone was the development of fine denier monofilament yarns and of fine gauge knitting machines making possible what was now known as the dry knitting technique.

Turning to the sizing materials used, Mr. Sheppard said that with few exceptions, multifilament yarn for the knitting industry was treated in an aqueous solution of polyvinyl alcohol (p.v.a.) and boric acid, the latter being added to render the p.v.a. less sensitive to moisture. The aqueous solution was known as PM 80 and was composed of 8% p.v.a. and 1·6% boric acid. Meticulous care was observed throughout the preparation of the gum as variations in manufacture could have an appreciable effect on gumming operations.

The method of processing was by the single-end gumming machine, all being basically alike, said Mr. Sheppard. The standard type of machine consisted of multiples of six spindles, each spindle position comprising a stainless steel roller rotating in a shallow trough through which the gum solution was circulated. The amount of gum applied to the yarn was governed by the relative speed of the gum roller surface to the linear speed of the yarn.

The amount of water in p.v.a. gum ranged from 80 to 90% according to type. To assist in drying out this high moisture content the processing room conditions were normally controlled at moderately high temperatures and low percentage relative humidity. When non-twistset yarn or yarns requiring high gum content were processed however, localised drying media were often incorporated in the system to supplement the ambient conditions.

Conditioning was essential as complete drying out of the yarns was achieved only after prolonged periods. Yarns gummed after twisting could be left on cylinders in the gumming room for from 12 to 36 hours depending on the package weight and amount of gum applied. A departure from this rule was observed when yarns were twisted after the gumming operation. Where a pre-gumming sequence was practised the lag time before twisting should be reduced to a minimum as the torsional rigidity of the gummed multi-filament yarn increases as the gum dried out.

Mr. Sheppard said that the increase in torsional rigidity could also affect the twisting process especially where intermittent variations in gum content existed along the length of yarn. For this reason, and other economic factors, a number of yarn processors had modified machines to gum and wind direct on to double flanged uptwister frames without delay. The high rotational speed of the yarn package during the twisting operation caused the yarn to be partially dried as the yarn unwound and, the gum being still moist and pliable, minimum restraint was placed on the yarn in the twisting zone. This absence of restraint permitted uniform twisting even though variations in the gum content might exist along the yarn.

Mr. Sheppard then considered some of the major operating factors affecting the amount and uniformity of gum applied to a yarn. Among these were the speed, uniformity of rotation and concentricity of the gum roll; the viscosity of gum in the machine circuit; the contact of the yarn on the gum surface; the percentage of solids on the gum; the stability of the thread in contact with the gum roll, and the volume of gum through troughs and absence of gum aeration.

The suggested operating conditions were a gum viscosity of 26–2 centistokes at 25°C. a thread/gum roll contact arc of 50–1·5°; a gum flow of 250–300 cc. per min. per six position trough; a gum roll speed dependent on denier,twist and amount of gum to be applied. Thread stability was ensured by the application of the minimum tension

At the Textile Institute one-day conference (l. to r.) Mr. G. Sheppard (British Nylon Spinners Ltd.) (Mr. W. A. Dutton and Mr. T. S. Nutting (both of the Hosiery and Allied Trades Research Association)

(l. to r.) Mr. D. Finlayson (industrial consultant) (Mr. E. D. J. Poole (Wool Industries Research Association) and Mr. F. H. Clayton (Wm. Frost and Sons Ltd.)

to eliminate flutter of the thread. These factors, and the percentage of solids, which depended on the type of gum used, were the essence of good gumming, particularly where gumming before twisting was practised.

After examining some of these operating factors in greater detail, Mr. Sheppard concluded by saying that although the operation involved in gumming nylon yarn for knitting was basically simple, many hidden dangers were inherent in the process. These could, however, be minimised if correct technical control was observed. The dry knitting technique was now being used to a considerable extent in the stocking trade and a similar development was also taking place in the warp knitting trade. But even if less gummed yarn were required in the future, the maintenance of the highest quality in the gumming process would always be in demand.

Textile Institute Conference

Principles and Costs of Winding Worsted Yarns

IN his address to the conference, Mr. R. M. Gimson, (director, Benjamin Russell and Sons Ltd.), said that winding was a most important operation in yarn preparation and depended on meticulous care of detail to ensure its proper functioning. It would not be true to say that good winding could make bad yarn into good, the converse was very true. The quality and regularity of fabric was influenced to a very large extent by the quality of the winding and package presented to the knitter. Unless this yarn was stronger, more free from faults and in better form for free and even unwinding than when delivered by the spinner, then winding had failed in its primary objective.

The basic principles of winding, said Mr. Gimson, were to transfer the yarn from one package to another, to present the yarn in the best possible form for the following processes and to provide an opportunity for inspection of the yarn. The first object was to transfer the yarn from a small package to a larger one so that a package with the best possible unwinding properties and with the maximum length of yarn commensurate with the space available on the bobbin stand was available. During winding, the yarn should travel in as straight a line as possible once it had tension applied to it, as deviations in the yarn path could cause severe strains on the yarn. Yarn tension during winding was of paramount importance and had to be carefully studied for each application. A good rule to observe was that tension at spinning should not be exceeded in winding. It was entirely fallacious to think that weak places in the yarn could be taken out at winding by increased tension without gravely risking the introduction of more weak places and generally reducing the quality.

Bobbins had now been for the most part superseded by cones. The winding speed was greater, a longer length of yarn could be wound on to a cone, more yarn could be wound in a given floor area on a cone winding machine, and far less labour and transport were required for handling empty cones than for empty bobbins. Many knitters thought that they could get a better off-wind from a cone than a bobbin, but in limited tests at H.A.T.R.A. it was found that the knitter had a greater "margin of safety" with the adjustment of thread guides when using bobbins than when using cones.

Sharp taper cones were used for worsted and woollen yarns as the rate of take-off in knitting was slow compared with warping. On flat knitting machines the take-off was intermittent and the taper of the cone had to allow the yarn to be taken off without dragging. In building a big cone the initial taper had to be increased as the package was built up to ensure the clearance of the yarn from the face of the cone during knitting, and on most knitting machines the yarn guides were only 12 to 18 ins. above the tip of the cone in order to keep the overall height of the machines within bounds.

Slow taper cones were used for man-made fibres and for worsted warping yarns as the change over on magazine creels was much easier with slow taper cones, the yarn was being taken off at a much higher speed in warping than in knitting and a higher speed yarn was obtainable with a slow taper cone compared with a sharp taper.

Inspection was the most important of the objects of winding and the one, said Mr. Gimson, which was most unsatisfactory from the knitter's point of view. There were several faults in the worsted yarns received from spinners and these should all be removed and replaced by weavers' knots. Mr. Gimson referred to an adhesive for joining two ends of a worsted yarn which had been developed by the Wool Industries Research Association. As two solutions had to be used at present it was however rather slow and the knitted fabric had to be scoured. Worsted spinning machinery was now being offered with bigger packages on both spinning and twisting frames, drawing operations were being reduced, and, on the new Bradford system the Ambler flume acted as a slub catcher. The winder then could expect less slubs and knots in the future in addition to better electronic measuring and detecting devices.

Mr. Gimson went on to examine the factors affecting winding methods in some detail and submitted a considerable amount of data on the effect of winding methods on costs of £275 per 100,000 lb. 2/38s worsted yarn, and saving in materials of between £250 and £1,000 according to gauge and type of knitting machine had been made possible through using power driven double waxers and setting clearers at 0·018 in. instead of 0·025 in. In addition, saving had been made possible in knitting costs as the number of machines per operative could be increased given better wound yarn.

Finland:
Poplin Materials

Martti Kansanen Oy, Rautatienkatu 15, Helsinki, are anxious to secure a U.K. agency of poplin materials (54/55 ins. wide). Established in 1934, they represent twelve U.K. firms for textiles, and close contact is maintained throughout Finland. Manufacturers interested should write direct, also notify the British Embassy, C Department, 18 Etela Esplanaadikatu (6th Floor), Helsinki.

New Zealand:
Canvas

Robert Malcolm Ltd., 79 Lichfield Street, Christchurch, would like to secure a U.K. agency for heavy and light canvasses. The heavy canvasses are the type supplied to the navy, railways, etc., and the light canvasses are dressed and proofed suitable for the oily raincoat trade. They are an old-established firm with branches in Auckland, Wellington, and Dunedin. Manufacturers interested should write direct, also notify the Trade Commissioner, Government Life Insurance Building, Customhouse Quay, P.O. Box, 369, Wellington, C.1.

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Inspecting, Treating and Finishing Woven Fabrics

Extension of the end use of jute products has necessitated considerable elaboration of the normal finishing treatments which vary, of course, with the specific end-use of the material

By S. A. G. CALDWELL, F.T.I.

THE general term "finishing" covers a wide range of processing operations designed to eliminate defects and improve the appearance of the loom state cloth, as well as its serviceability in use. Beginning with inspection to discover and, as far as possible, remedy defects originating in manufacture, this is followed by a series of mechanical operations: cropping, damping, calendering, mangling, measuring and lapping or folding, interspersed with, or succeeded by one or more chemical treatments. The latter include bleaching, dyeing, printing, rot proofing, water proofing, flame proofing, and many other finishes of more recent origin designed to improve serviceability and stimulate consumer interest. These are employed as demand or ultimate purpose may require.

While the nature and extent of the finishing operations are dictated largely by end use requirements, the techniques followed and the means employed to achieve a specific result are determined mainly by fibre characteristics, and differ considerably in various sections of the textile industry. The determining factors include fibre structure—whether simple as in the case of cotton, or composite, as in the bast fibre group of which jute is a member; physical properties, including particularly capacity to absorb the liquids used in the various finishes; chemical composition, which in the compound fibres includes the inter-fibre binding substances as well as the fibres themselves.

The relatively simple finishing treatment required for most standard jute fabrics involves only the application of moisture, pressure and heat under suitable conditions. The extent and nature of the treatment given is determined by end use. A substantial percentage of the total output of the industry is devoted to the production of sacks and bags, or is in the form of open width hessian for packaging purposes. For most of this the finishing treatment is relatively simple, and mostly of a mechanical nature, being concerned with closing up the fabric structure and removing surface irregularities. For some purposes the fabric may require to be rot proofed, and frequently in the case of sacks and bags, the users name, trade or other distinctive mark and description of the contents, is applied in one or more colours by machine printing.

The very considerable extension of the end use of jute products in post-war years has necessitated considerable elaboration of the normal finishing treatment, this varying with the specific end use of the material. In the form of brattice cloth used in mines and elsewhere fire proofing may be included in the finishing treatment. Water proofing may be necessary for certain end uses, as tarpaulins, etc. Its entry into the market for household furnishing fabrics has necessarily required a higher degree of purification by chemical treatment to improve the colour, handle and draping properties of the fabric, and to provide an appropriate foundation and background for the application of printed design. or to facilitate dyeing.

Inspecting, etc.

Loom state fabrics usually undergo a preliminary inspection to rectify "floats" and "plucks," to remove thick slubs, knots, etc., that might result in damage to the cloth if left to be removed by the cropping machine. For this purpose the material may be drawn over a table of sufficient length and width to give the examiner opportunity to view a reasonable length of material in open width. Examination will be facilitated by using a table with glass surface, which is illuminated from below, as shown in Fig. 1, or alternatively, by drawing the cloth down from overhead guide rails and examining it against diffused light—natural or artificial—which shows up the defects more readily than if the material is examined against an opaque background.

Cropping, or shearing, is intended to remove projecting fibres, sprit, loose ends, etc., from the surface of the fabric. This improves the appearance of the finished material by ensuring a cleaner and more lustrous surface. Cropping is effected by

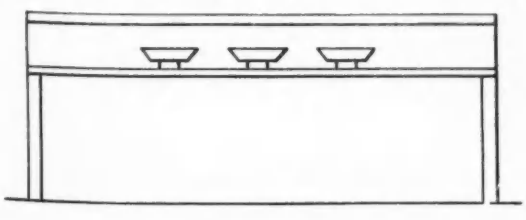


Fig. 1. (left) Examining table

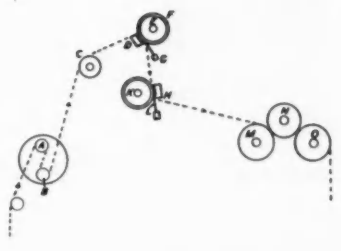


Fig. 2 (right). Cropping machine

passing the cloth through a machine equipped with two or more pairs of revolving spiral cutters, each of which functions in conjunction with a fixed blade. The general disposition of the cutters and blades in relation to the path of the fabric is indicated in Fig. 2, which shows a sectional elevation of a double spiral cropper, one set of blades shearing the upper surface, and the other the under surface of the fabric.

The material is drawn into the machine round the fixed tension rails A and B, passing over a guide roller C to the guide plate D. The front of the latter is concave, with elevated edges which permit the fabric the necessary adjustment when in contact with the spiral blades F of the revolving cutter E, also permitting close setting with the stationary blade G, between which and the revolving blades the shearing action is effected. The guide plate D and the stationary blade are adjustable to suit the requirements of various thicknesses and qualities of fabric.

The setting of the stationary blade in relation to those of the revolving cutter is such that the latter revolve in contact with the edge of the former, which is hollow ground to the path of the periphery of the spiral. On clearing the first shearing unit the cloth passes to the second, indicated at H, K, L, which acts on the opposite side of the material in similar manner. It then passes out of the machine by way of the delivery rollers M, N, O, the surface speed of these determining the rate of through put, which is usually in the region of 8 to 10 yards per minute. Quadruple machines are generally designed in the form of two double cropping units mounted in tandem on one pair of gables. If desired, revolving brushes or scrubbers may be introduced preceding the shearing units their function being to rough clean the surface of the fabric, and raise the loose surface hairs by rubbing contact to ensure effective action by the shearing blades.

Cropping and Damping

Damping is an essential preliminary to the main mechanical finishing treatment of calendering, chesting, or mangling, the moisture content of the cloth when stored in normal atmospheric conditions being insufficient for the purpose. Damping increases the plasticity or mellowness of the fabric, so that it is more responsive to the subsequent mechanical treatment, which is intended mainly to flatten out the threads, thereby closing up the fabric structure, giving it a more lustrous appearance and firmer handle.

Various types of damping machine are in common use, their efficiency being measured by the uniformity of moisture distribution on the fabric. Brush or spray damping units are used widely for jute finishing. In the first mentioned, shown in Fig. 3, moisture in the form of fine spray of water is distributed on each side of the fabric as it is drawn between a pair of revolving brushes A and B. The bristles of the latter pick up water from rollers C,D, revolving in the water troughs E and F. The surface speed of the brushes is such that they sweep the wet surface of the rollers, throwing off the water in a fine spray which impinges on the surface of the fabric. The speed of the latter through the machine is determined by the drawing off rollers G, H.

In spray damping units the revolving brushes and rollers give place to spray producing devices. In these the water is usually forced under pressure through a series of nozzles. These direct fine jets of water on to distributing vanes against which they are vaporized and deflected on to the surface of the fabric. Machines of this type are fitted with an automatic device which cuts off the water supply when the machine stops, to prevent over damping of any part of the fabric.

The amount of moisture added, and the time required for the cloth to condition, or attain uniform distribution, varies with the weight and class of fabric and subsequent finishing treatment. The addition of 4 to 6% water, based on the fabric weight is considered appropriate for standard fabrics intended for a calendar finish. Goods for mangling may receive a lighter damping, approximately 1 to 2% less moisture being added. The period required for the fabric to condition ranges from 6 to 12 hours, increasing with the cloth weight. The usual practice is to keep the output from the dampers one day ahead of the calenders so that it has an opportunity to become uniformly conditioned over night. The rate of delivery from the damping machine ranges from 125 to 150 yds./min., depending on the weight of fabric and the amount of moisture added.

Cropping and damping are essential preliminary operations to the actual finishing process which, for most jute fabrics, is effected on the calendar and mangle, some being calendered only and others mangled subsequent to calendering. Each method imparts a characteristic finish to the material. This is obtained by the combined action of pressure and heat on the damp fabric, which in this condition is soft and pliable so that the necessary compression produces a flattened smooth surface which is set and glazed when passing over the steam heated roller.

The extent of the calendering action varies with the number and type of rollers, which determine also the number of "nips" given. Three and five bowl calenders are usually

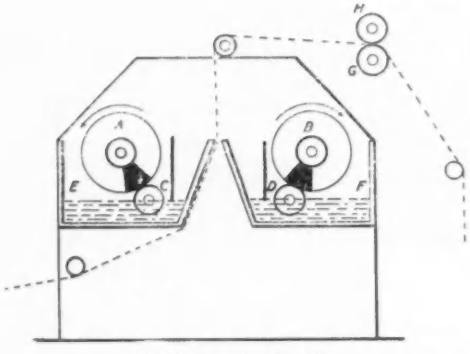


Fig. 3. Damping machine

(below) Sectional view of the bowls of five roller calender

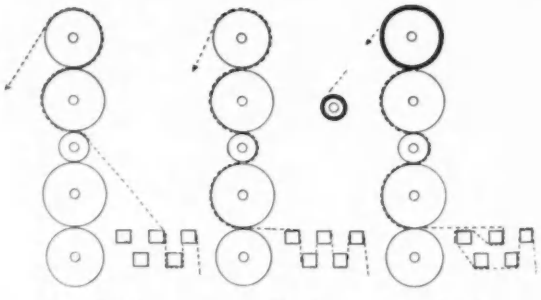


Fig. 4 Fig. 5 Fig. 6

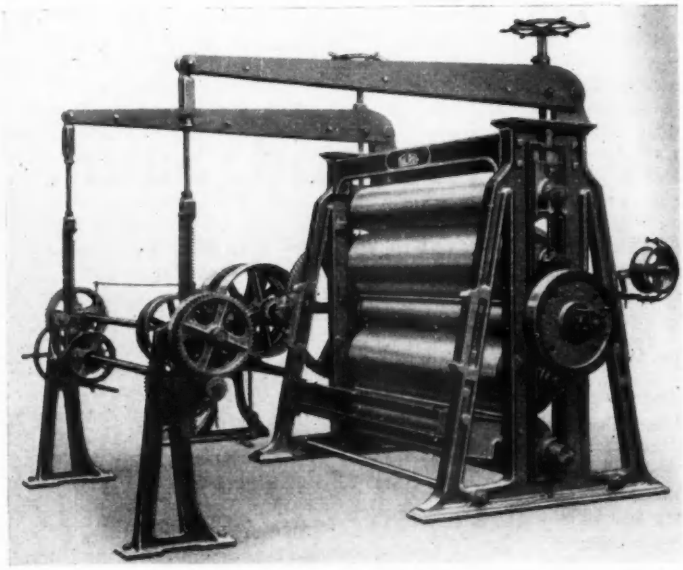


Fig. 7. A five bowl calender (Urquhart Lindsay and Robertson Orchar Ltd.)

sufficient for processing jute goods, the first mentioned being used to give a light finish, and five bowl units for a high class finish. The width of machine varies with the class of work for which it is required. The effective length of bowl ranges from 50 to 170 ins. Some 90 ins. roller units are commonly used for narrow and medium work, permitting two 40 ins. cloths to be run through side by side. The considerable weight of this machine—a 90 ins. unit weighing about 25 tons—demands a specially prepared foundation, usually of concrete 12 to 18 ins. thick, while the vertical disposition of the rollers calls for considerable head room, up to 18 feet being necessary to ensure lever clearances.

Five Roller Calender

A sectional view of the bowls of a five roller machine, together with the usual method of railing the cloth for a light finish is shown at Fig. 4, and for a heavy finish at Fig. 5. For a chest finish, as indicated at Fig. 6 the cloth is entered as for calendering, though the method of railing may be heavier, as shown. On reaching the top bowl the whole piece is wound round it. The bowl is rotated for a period ranging from three to eight minutes, the direction of rotation being varied to prevent damage to the material. On completion of the process the loading is released and the bowl with the material on it is raised clear of the lower bowl to permit the piece being unwound. Chesting imparts a full thready finish to the cloth.

A five bowl calendar of the type used for finishing jute fabrics is shown in Fig. 7. This machine is made by Urquhart Lindsay and Robertson Orchar Ltd., Dundee. It comprises a lower cast iron roller followed by a compressed paper roller. The small diameter centre roller is steam heated. Immediately above it is a second compressed paper roller with, finally, a cast iron roller on top. Pressure between the rollers is augmented by means of the long steel plate levers attached to a vertical rack arrangement working in conjunction with a pressure pulley and drop weights. Fig. 8 shows a calender equipped with a special stenting device made by the same firm for finishing tubular woven cloth.

Fabrics intended for mangling are first beamed hard round an iron roller or "pin" which is then placed between the bowls of the hydraulic mangle. Very considerable pressure is applied to the top bowl, being transmitted to the roll of cloth on the pin, the direction of rotation of which is changed from time to time during the process, as in chesting. Treatment is continued for 10 to 20 mins. as deemed necessary. Mangling imparts a soft full finish to the fabric. While calendering effects an increase in length and contraction in width, mangling has the opposite effect, thereby tending to ensure part restoration towards the original dimensions.

The succeeding operations of measuring and rolling or lapping may conveniently be effected at the same time, a measuring roller and length indicator being mounted at the intake end. Lapping is a convenient method for making up most classes of jute goods. If desired the length of traverse may be made to an appropriate length for cutting up for sack making, provision being made for effecting this on the table. The speed of this machine is usually about 25 double laps per minute, the rate of output depending on the length of traverse. For convenience in handling and transport wide fabrics are usually doubled on the length by bringing the selvedges together.

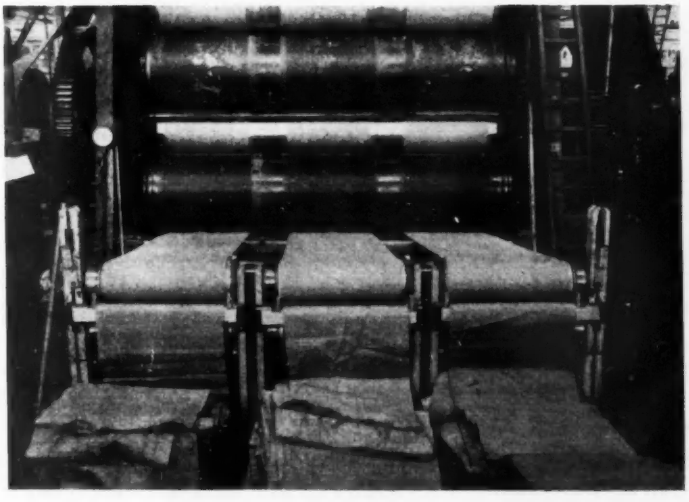


Fig. 8. Calender equipped with special stenting device (Fairbairn Lawson Combe Barbour)

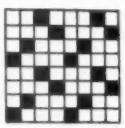
Silk Fabrics: Twills and Satins

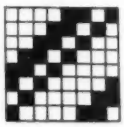
Names of cloths, weaves, ends and picks, and types of yarns used in warp twills, weft and warp faced satins, ribs and crepes, etc.

By W. MIDDLEBROOK*

CHARMANTE satin is a 2×1 warp twill using crepe silk yarns, the appearance of the finished fabric lending point to its name, which means "charming." Another 3-end twill is a lining fabric called *croissé silk*, as also is *florence*, a 1×2 twill with organzine warp and tram weft; in France, *florence* is synonymous with *sarcenet*, a lining fabric. *Batavia silk* is a 2×2 twill with schappe weft. *Satin ture* is a 4-shaft twill resembling a *satin crepe* in that it is a broken twill weave as shown at Fig. 27. *Foulard*, which is French for "silk handkerchief," is a 2×2 twill of light-weight silk, printed with blue or black spots on a white ground, one quality being 120×140, 40 den. warp and 90 den. weft. Other silk linings are *avignon*, with organzine warp and tram weft; *laventine*, a thin silk for sleeve linings that may be plain or twill; and *radames*, a 2×2 twill for linings of dark shades. *Leontine* is a silk dress fabric with a 2×2 twill weave, end-and-end of a three-colour warp and cream weft of boiled silk, 200×120, 75 den./100 den. Another dress and waistcoat fabric with alternate colours in the warp is a *royal piquette*, a fancy twill on 16 ends and 6 picks. *Duchesse mousseline* or *muslin* is really a *duchesse satin*, woven with a 12-end twill instead of a satin weave. *Carreaux* is another dress fabric being an all-silk check pattern in twill or satin weave; the name means "squared." *Pailette noir* or "black spangle," is a fine silk twill with a glossy finish.

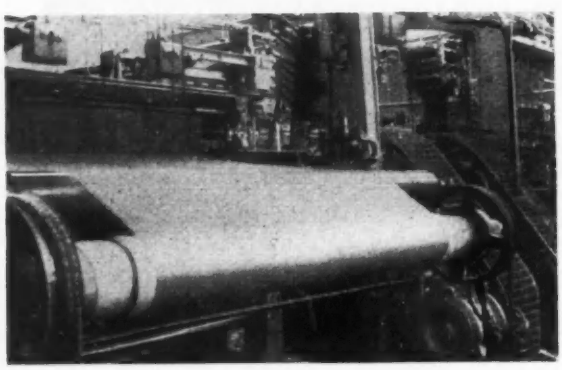
Very strong fabrics can be made from pure silk, one example of *heavy gum twill* being a 2×2 weave of 20/22 den. 4-thread warp and 150 den. tram gum weft; at 150 quadruple ends per inch this equals 600 singles per inch by 104 picks. Many nett silk twill fabrics are made specially for printing, just as in the cotton trade there are calicos termed *printers*. Usually a 2×2 twill weave is used, and one example is 100×80, 20/22 den. nett silk warp and 2/60s schappe silk weft, giving a white, soft, though firm fabric ideally constructed for hand-block, screen or machine printing. Tight selvedges must be avoided in these fabrics and, where the selvedges are not mounted on separate "hanker" bobbins, this can only be achieved by spacing out the selvedge ends at the sides. A *royal twill* is a fine silk dress fabric usually made on 8 shafts, one example having 140 3-thread singles of 20/22 den. gum silk and 84 picks of 2/60s washed spun silk weft per inch. It is a heavy fabric, requiring firm weighting, early shedding and good templing if a satisfactory cloth is to be made, and the design, shown at Fig. 28, is usually woven face down, making a weft twill running from left to right. Another heavy twilled silk has a 4×4 twill weave; of 20/22 den. gum silk singles, entered 4 ends in a mail, a fabric 38 ins. wide has 30,000 ends of fine silk, or 200 ends of 4-thread per inch, and 100 picks of 200 den. tram gum silk per inch.





left: Fig. 27
right: Fig. 28

* *Brocklehurst-Whiston Amalgamated Ltd.*



Nett silk warp in loom

Satins

A satin cloth, weft faced or warp faced, shows silk to its best advantage. Indeed, *satin* means *silk*, a French word from the Italian *setino* and the Latin *seta*, which meant "a bristle" and, in late Latin, "silk." Noted for its sheen, its smooth, glossy surface, it is not surprising that dress satins are given such regal names as *duchesse satin*, *royal satin* and *regence satin*, while adjectives such as *charming* and *marvellous* are also used in the French names. *Merveilleux* is a dress fabric with a satin face and a twill back, while *charmeuse* or "charmer" has a satin face with a crepe back. *Messaline* has a 5-shaft satin weave, an all-silk dress fabric with an average quality of 200×100 of 18 den. bright silk; the fabric is named after Messelina, wife of the Roman Emperor Claudius, and it is classed as a lightweight satin. Another type of *messaline* is called *peau de cygne* or swan-skin, an 8-shaft satin weave with the weft crossing over 2 ends at a time, giving a crepe effect that gives rise to its poetical name. *Mousseline satin* is another 8-shaft weave with a fine nett silk 50 den. warp and 100 den. weft, and a low pick rate that makes it indeed a "muslin" satin. *Oriental satin* is the same type, but with spun silk weft.

"*Angel skin*" is the poetical translation of *peau d'ange*, a 12-end satin with a rayon warp and schappe weft, 350×90,

75 den./2/200s, and *peau de soie* or "silk skin" is a reversible dress fabric on an 8-shaft satin base. Not quite so poetical, perhaps, is "onion skin," though the French title of *pelure d'oignon* looks most imposing; this is a 5-shaft warp satin used for hat trimmings. *Panne* means "plush," and this describes the thick, glossy surface of a heavy, high-class dress fabric called *panne satin*. *Paillette* means "spangle," describing the shot effect of *paillette satin*, a 5-end satin of nett silk. *Duchesse satin* has a 12-end weave, a warp satin of 16/18 den. with 30s spun silk weft, 360×100. *Satin royal* is a heavy fabric using two warps, having twill-face satin stripes and a satin back. *Satin regence* is another rich silk satin dress fabric, with a fine cross effect in the weft.

Liberty satin is the trade name for a soft, piece-dyed fabric with grege silk warp and spun silk or schappe weft, an 8-shaft satin used chiefly for linings. *Satin lyonnais*, another lining fabric is a 5-shaft weave with grege warp and weft and has a lustrous finish; another form of this name is *satin de lyon*. *Satin grec* or *Greek satin* is an 8-shaft lining. *Satinises* are an inferior grade of satin linings, while *satin de chine*, a 10-shaft warp satin with grege warp and tram weft is used for both dresses and linings. *Luxor satin* is a reversible fabric, a heavy dress material; another heavy cloth is *satin double face*, using two warps of organzine and tram weft, though cotton weft may be used in inferior grades. The word *moire* describes a watered effect in fabrics that can be produced by pressure on engraved rollers. *Moiré suprème* is a silk warp satin with this watered finish. *Satin ondé* is an 8-end dress fabric, and the word *ondé* also means "watered or waved," a word that gives rise to *ondule*, describing the wavy ornamentation of ondule effects.

Satin checks are dress fabrics with satin checks on a plain ground. *Taborette* has stripes of warp satin and weft rib, the satin stripes being heavily crammed; the material is dyed for curtains. *Foulard* means, in France, a silk handkerchief and *satin foulard* is a warp satin with a smooth, glossy finish, printed with spots on a coloured ground. *Satin crepe* uses crepe twist weft, 26 den. warp and weft, 300×100 and *satin faillé crepe* is a heavy fabric using two warp beams, an 8-shaft warp satin with ribbed back, again with 26 den. crepe weft, 100 picks/in. and as many as 1,000 ends per inch. Other silk satins include *radyimar*, *radames*, *satin lumière*, *soleil* and *soie de devil*, though *radames* may also be a 2×2 twill silk lining fabric, and *soliel* a very strong fabric of cotton, worsted or silk, with satin weaves doubled or trebled for extra strength.

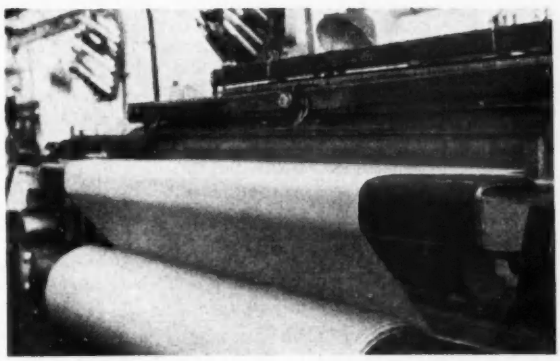
Ribs and Crepes

Several silk fabrics of the poplin type are constructed with ribs across the piece. *Bengaline* is a silk fabric with weft cords of wool or cotton, but *bengaline de soie*, as its name implies, is wholly of silk. A thick cord *bengaline* with third cord of crepe yarns that give a crinkled effect, is called *ordine*. Another thick corded silk of the heavy poplin type is *ducape*, the name referring to a cape, cloak or riding habit, while *helvitia* is a fine poplin printed on both sides, with a grege silk warp and schappe silk weft, and the warp ends double the picks. *Faillé* is a French term for a silk head-dress fabric of the poplin type, an excess of warp over weft making a flat rib; in the middle ages it was used exclusively to describe the long veil worn by a nun. *Faillé francaise* is a silk dress fabric using two warp beams, and with two or more picks in a shed giving a bold rib of grege weft on an organzine warp. *Failletine* is a light, evening dress fabric of the poplin type, while *faillé crepe* is a silk poplin with a satin back, a compound fabric with a hard spun silk weft face and a soft schappe silk back, 400×84.

Cannelle repp has two warps of single and double yarns, the single ends forming the ground and the double ends floating over 8 picks at a time, making a small rib. The name *cannelle* is applied to a type of stripe or check pattern like bamboo joints, and really means "grooved." *Epingle* is another ribbed fabric with large and small ribs alternating; when applied to fabrics, the French *epingle* means "terry," like the looped ribs of terry towelling. *Hongkong cloth* has a silk warp and ramie weft, giving a light rib effect; it is used for clothing. *Ottoman cord* has ribs down the piece instead of across; so also has *millerayes*, a silk term for a warp rib fabric in fine coloured stripes giving a rainbow effect—"a thousand rays." *Crepe radio* gives a rib effect with a grège silk warp and crepe weft.

Weaving Crepes

Where most cotton crepes have to rely on a crepe weave to produce the essential crepe or crinkled effect, the majority of silk crepes are plain-weave fabrics made with highly-twisted crepe yarns. In recent years the advance of textile science and technology has made the production of silk crepes much easier from the weaving point of view. One of the problems facing the weaver was control of the highly-twisted weft yarns to prevent the ruination of a fabric by snarls, loops and lashing-in of the weft. The basis of a crepe cloth is the mixing of "S" and "Z" twist in the weft, with two picks of each alternately, and in some cases it was possible to prevent one twist curling round the other at the drop-box or circular box side and



Spun Crepes

drawing it part way into the cloth only by an elaborate system of weft-trap wires across the box mouth, or by pieces of fur or swansdown at strategic positions. The weft also had to be steamed to temporarily "kill" the twist and prevent or reduce snarls and loops, but the steaming process added another problem in the silk trade by warping and spoiling the small wooden spools or pirns on which the weft was wound. Now the use of fibre pirns that hold three or four times as much yarn as the old-type wooden variety, together with a process that takes out the excessive liveliness of crepe yarn without the need for steaming, makes the handling of crepe weft much easier. All that remains to be done for its trouble-free use is a well-furred shuttle with a system of drag that will prevent snarls.

Perhaps the best known of pure silk crepes is *crepe de chine*, represented by nett silk crepes and spun silk crepes. A heavy quality nett silk *crepe de chine* may have 180 ends/in. of 20/22 den. 3-thread nett silk, which means 540 singles per inch, and 104 picks/in. of "S" and "Z" twist crepe silk yarns. Such a fabric would be best made in a shaft or

tappet loom, owing to the excessive weight required on the warp beam to take out "spangle," with the heald shafts beginning to cross at top centre with a slight split; i.e., with the ends entered on 6 shafts as a plain weave, each pair of shafts would cross at a different time. No temples are required on a fabric of this type, the "S" and "Z" twist of the weft holding out the cloth to the required width. A heavy spun silk *crepe de chine*, known as *spun crepe*, can be made on 4 shafts, with 130 ends/in. of 2/50s washed spun silk with a weft-way twist, and 112 picks/in. of "S" and "Z" nett silk crepe weft. Again, no temples would be required, the aim being a clean and creaseless fabric free from snarl or roughness. A lighter quality gum silk *crepe de chine*, would have 130 ends of 20/22 den. 2-thread or 260 singles, with 100 picks of "S" and "Z" crepe weft per inch, and a lighter *spun crepe* with 100 ends/in. of 2/50s gassed and 80 picks of "S" and "Z" weft. Two heavy qualities of *crepe de chine* are called *canton crepe*, a coarse crepe, and *crepe antique*.

When spelt *crape*, this fabric is usually associated with mourning in this country, and *bologna crepe* is specially made for that purpose; on the other hand *crepe de chine* is essentially a dress material. *Crepe romaine* is a lining fabric, with a 2×2 matt weave of hard-twist yarns of 13/15 den. *Flat crepe* is a nett silk crepe de chine and *laos* is a fine silk crepe dress fabric with grège warp and tussah weft. *Taffetas crepe* is another heavy crepe with hard-twisted yarns. Crepe weaves and pebble weaves are sometimes used, as in *louisine*, an 8-shaft silk fabric with a crepe weave, similar to that shown at Fig. 29, and *peau de cygne* or swan-skin, a fine fabric using bright silk and an 8-shaft weave with a crepe effect. *Chagrin silk* has a pebbled weave made to resemble shagreen leather. A pebbled surface from a dobby weave is given to *poult de la reine*, a heavy silk dress fabric. *Poult de soie* means "stout silk" and *reine* means "queen," which give us a name indicative of a royal, heavy quality. Another silk fabric with a pebbly appearance is *Crepe Elizabeth*, a repetition of the "queen" motif, in this case a lighter crepe of the georgette type. The silk *georgette* is made from both warp and weft of "S" and "Z" twist, usually a light fabric with lively warp yarns that need careful handling when gaiting, otherwise one twist locks round the other and breaks a lot of ends out. *Crepe georgette* is a fabric of this type, as also is *georgine*.

Armure is a French term meaning a small pattern, a rough, pebbled appearance similar to the chain mail of medieval (and modern) armour; it is a term given to a special weave in both silk and woollen fabrics, though there is no set design, which may vary from 8 to 24 shafts. *Armure bosphore* is a silk armure with a reversible pattern; *Armure satinée* has a fine twill armure face and a satin back. Fig. 30 gives the design for a simple armure weave on 8 shafts, with the first 4 shafts lifting as a 1×3 twill and the back 4 weaving a 3×1 twill in the reverse direction. With a warp of 2/60s spun silk, 150 ends/in., the warp threads are entered straight over in pairs, for added strength, and 4 ends per dent in the reed; selvedges are entered on 2 extra shafts weaving tape or 2×2, and there are 80 picks/in. of 2/40s spun silk. In spite of the comparatively thick yarn and high rate of ends per inch, this is not a heavy cloth to weave, the combination twill weave allowing the yarn to interweave comfortably. Other silk cloths sold as *armures* include *ottoman*, *royale*, *louisine* and *barathea*. A *barathea* is really a twilled hopsack weave, usually a 4×4 hopsack or "4 picks in a hole," and a silk *barathea* dress fabric may have cotton or worsted weft. A simple 8-end barathea is shown at Fig. 31, and again in this, as with the armure, the selvedges are entered on 2 extra shafts to give a tape edge.

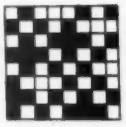


Fig. 29

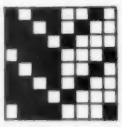


Fig. 30

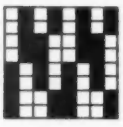
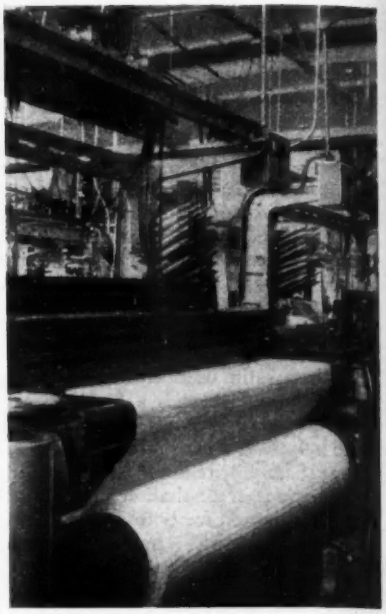


Fig. 31



Volant

A strong catch cord is needed at one side to hold the weft, as the 4×4 ground weave would otherwise let it go. One example of a *barathea* has a warp of 20/22 den. nett silk singles, 8,000 2-thread ends in a 36 ins. fabric entered 4 per dent, and 96 picks/in. of 2/80s bleached cotton. Unlike the *armure*, with its twill weave, the *barathea* needs to be well weighted, with the heald shafts crossing early to make a firm cloth.

Crinkled crepe is a light silk fabric with a crinkled surface and *crystal crepe* has a crepe weave. *Crepe chiffon* is very light plain chiffon and *crepe lisse* has a gauze-like weave with crepe yarns in both warp and weft, used for trimmings; the word *lisse* meaning smooth and glossy. *Crepe mousseline* or *muslin crepe* has grège silk warp and crepe weft, with wavy lines warp and weft way produced by the finishing process. Another fabric with waved effects, in this case produced by a jacquard, is *crepe ondule*, the word *ondule* meaning "waved."

Tweed Coating Cloths

Beautifully woven and finished, the seven patterns on the facing page are a selection from the many high quality cloths manufactured by Cumberland Mills, branch of Otterburn Mill Ltd., Carlisle. Brief details are as follows:—

(1) An attractive and unusual checked effect in which royal blue and crimson knops are brought into sharp relief by the "squaring" achieved by the use of light blue, white and grey yarns.

(2) Only two types of yarns—black and white are employed in this very decorative "diamond" effect.

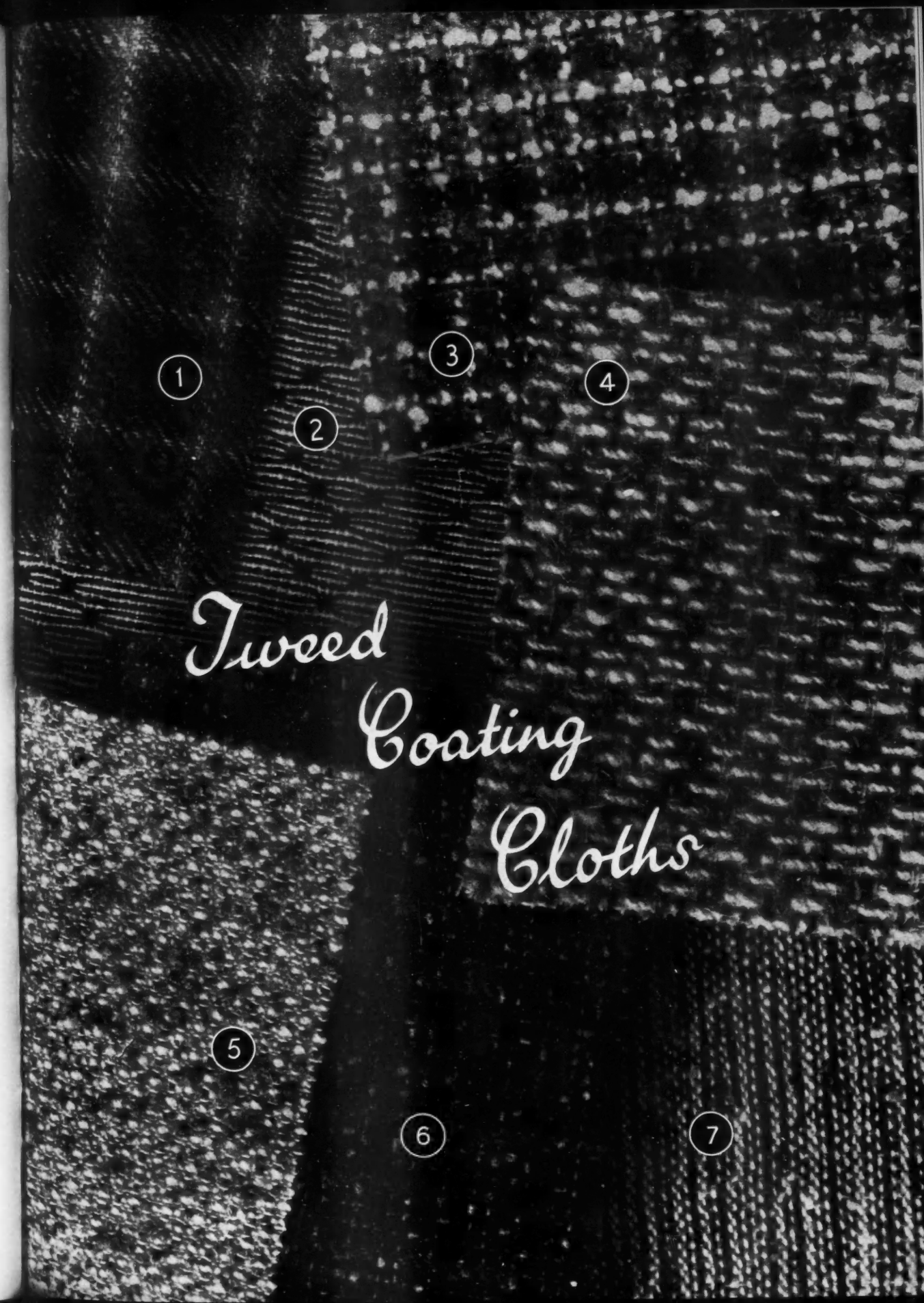
(3) Dark grey, light grey and white yarns are utilised in this smart pattern in which the white knops are brought prominently to the surface.

(4) Medium brown, white, daffodil and wine coloured yarns comprise this bright, random, slub and knop effect.

(5) Medium grey and white yarns are combined in this pattern to emphasise the medium grey surface knops.

(6) A delightful multi-coloured effect in which each shade has been carefully selected for balance. Bottle green, black, light blue and royal blue, crimson, grey, fawn and yellow yarns are employed.

(7) Variegated effect showing flecks of crimson, light blue, fawn and violet in random fashion.


1
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Tweed
Coating
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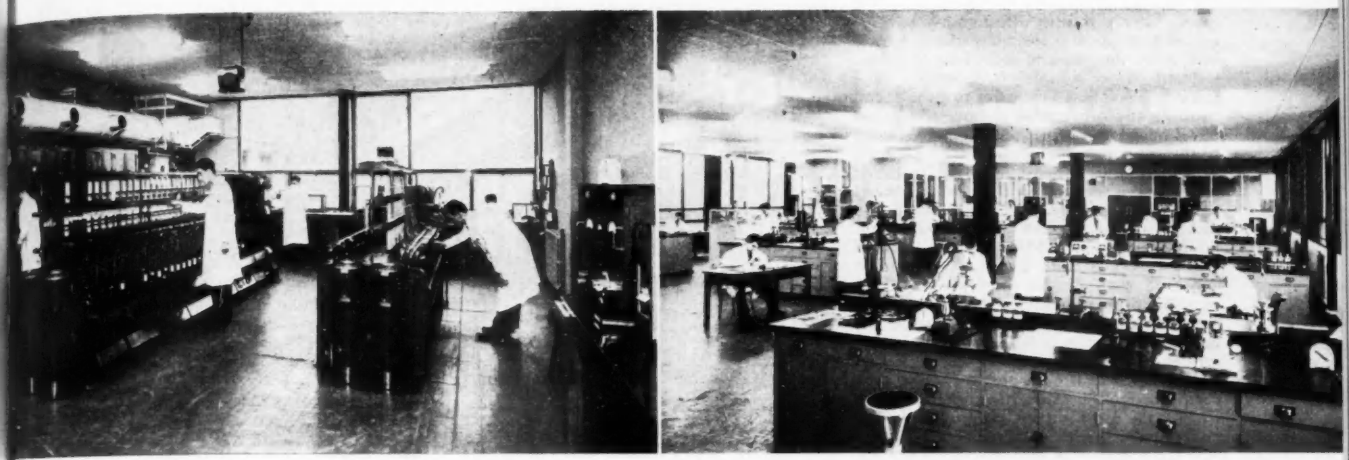


(left) A view inside the experimental spinning department and (right) one of the finely equipped testing laboratories of George Angus and Co. Ltd.

Fibre Drafting Elements, Roller Covers and Aprons

A review of recent new developments, including the use of surface active agents in synthetic rubber

By M. BALKIN, M.SC., PH.D., A.R.I.C.*

FOR many years in the processing of textile fibres, leather was widely used for fibre drafting elements both for covering rollers and later for draft aprons. Leather, being a natural material, was not always consistent and had to be specially selected. Roller covers and aprons had to be carefully prepared and showed a joint. To provide resilience, roller covers were underlined with a suitable felt material, and the preparing of leather draft elements became a specialised job.

Later cork was introduced as a drafting material, particularly for roller covers, and in many applications has given very good service. Its main disadvantage was its limited resistance to abrasion tending to cause grooving. Natural rubber, suitably compounded, was long ago considered for drafting elements but proved unsuitable since it has poor resistance to oils and greases derived either from the machinery or the fibres being processed. Natural rubber therefore became sticky and distorted on the surface after limited use.

It was the introduction about 25 years ago of the oil resistant synthetic rubbers that provided the first major advance. These could be compounded and vulcanised to provide materials of different hardness and resilience. The oil resistance and abrasion resistance were excellent. Roller covers and draft aprons could be made from them free from joints. Two main classes of synthetic rubber were used, namely the polychoroprenes (neoprenes) and the copolymers of butadiene and acrylonitrile (originally known as Buna N or Perbunan). Further work and experience in textile mills showed the superiority of the copolymer type of rubber, and to-day this base rubber is the most widely used synthetic rubber for drafting elements.

The butadiene acrylonitrile copolymer is the raw rubber—not used by itself—and has to be compounded and vulcanised. Compounding consists of the addition on rubber mixing machines of a variety of ingredients selected to provide the desired final properties. For instance, mineral fillers such as special grades of carbon black, clays or whiting, are incorporated; also plasticisers to soften the material and facilitate processing—and various other substances such as antioxidants and vulcanising ingredients. After mixing, the essentially plastic mass is formed to the desired shape such as extruded in tubular form for making roller covers. The material is then finally vulcanised under heat and pressure which provides a tough resilient product.

Whilst synthetic rubber compounded by conventional methods could do a useful job of work in drafting, it soon became evident that there was room for improvement. It did not necessarily function equally well with different fibres being processed. The type of frame, humidity, and the mechanical conditions of operation all affected the efficiency. "Eyebrowing" could occur. "Licking" and "lapping" was frequently a problem. End-breakage needed to be reduced to a minimum. The drafting element sometimes attracted grease on the surface which tended to congeal and so influence the frictional properties of the surface. Drafting was not always regular, causing thick and thin places in the line of the yarn. The surface of the element was not always what it should be—it was either too rough or too smooth.

It was clear that much work had yet to be done to design the ideal drafting element based on oil resistant synthetic rubber. Concentrated efforts were made by several manufacturers concerned with the problem and many proposals were made, many of which are covered by patents. It was soon realised that certain ingredients incorporated into the rubber composition could exert a profound influence on the material as a drafting element. Tiny discrete particles such as cork added to the rubber gave a slightly rough surface which prevented "eyebrowing" by carrying the fibres round into the clearer. A slightly rough surface could also be obtained by making the rubber finely porous. Where fibres attached themselves to the rubber under low humidity conditions, and thought due to electrical static effects, it was proposed to incorporate substances in the rubber to make it electrically conductive. Electrolytes were suggested and hygroscopic chemicals could be added to maintain a moisture content in the rubber to assist electrical conductivity.

Various special ingredients were proposed to provide improvements in frictional properties and to give a smooth satin-like

* *Chief chemist, George Angus & Co. Ltd., Newcastle-upon-Tyne.*

finish after grinding. Proteins were suggested to neutralise electric surface charges said to be the cause of attraction of fibres. Certain water-soluble hydrophilic substances have been claimed to give clean running and prevent the surface formation of oil or grease by providing oil repellency to the rubber.

Undoubtedly, many of these methods have proved useful, but there was no need to assume that all had been achieved in the design of the perfect drafting element. This was the view of the research team of George Angus and Co. Ltd. Since it appeared that all the more conventional compounding ingredients for rubber had been explored, they began to search for ingredients not popularly associated with rubber compounding. Their work resulted in a great advance in the technology of synthetic rubber drafting elements of which the most outstanding feature has proved to be the amazing benefits provided by incorporation in the rubber of *surface active agents* (B.P. No. 706,202).

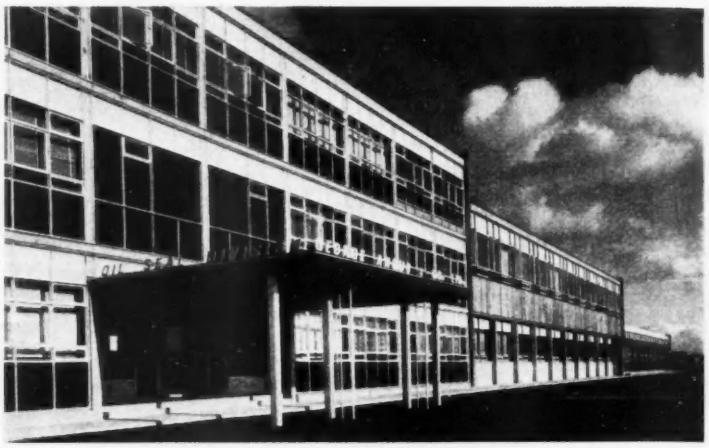
The new technique is such a valuable contribution to the science of compounding drafting elements that it deserves a more detailed description. It has been found that if surface active agents are added to the synthetic rubber during the compounding stage, drafting elements are obtained with many advantages. A special "cushioned" surface is obtained which resists any tendency to "licking" and "lapping." The attraction for fibres disappears. The surface continues to operate in service without contamination by oil or grease, and the processing of the fibres is smooth and regular. There is no tendency for variable drafting to cause thick and thin places in the yarn. Even at relatively low humidities, electrical static effects are non-existent.

Appreciable quantities of surface active agent can be incorporated in the rubber so that its action is permanent throughout the life of the material. As wear takes place, or when re-grinding becomes necessary, a new surface appears maintaining all the original properties.

Surface Active Agents

These are substances which are particularly active at surfaces or interfaces. A synthetic rubber drafting element provides resilience which is derived from the bulk of the material—but it was realised that drafting takes place at a surface, which is where particularly careful study is required. Chemically, surface active agents are very complex and difficult to classify, since they belong to many different chemical types. They are all characterised by a molecular structure which is essentially linear, i.e. considerably longer than wide. They are therefore long molecules. Whilst as a whole the molecule is electrically neutral, it is usually polar in the sense that one end of the molecule tends to be electrically positive and the other end electrically negative. Also one end of the linear structure is composed of radicals which are compatible with a solvent system or phase and the other end of incompatible radicals. Usually one end comprises a complex hydrocarbon radical of hydrophobic nature, while the other end is hydrophilic. The hydrophobic end is insoluble in water but soluble in oils, fats and rubber. On the other hand, the hydrophilic end is soluble in water but insoluble in oils, fats and rubber.

Surface active agents have the remarkable property of altering the surface nature of substances such as solvents to an extreme degree, even when present in very low concentration, and this effect results from their tendency, due to the molecular structure, to migrate to the surface and align or orient themselves at the surface with the compatible end immersed in the solvent and the incompatible end exposed.



Part of the modern buildings, etc., of the Oil Seal Division of George Angus and Co. Ltd.

There are three main types of surface active agents, namely non-ionic, cationic and anionic. The non-ionic show little tendency to ionise. The cationic ionise and provide a hydrophobic group which is the long chain cation. An example of a cationic surface active agent is cetyl pyridinium bromide. The anionic type ionises and provides a hydrophobic end which is the long chain surface active anion. An example is sodium stearate. Other examples are:—

Non-ionic
- Ethylene oxide condensate.
- Alkylated phenol-ethylene oxide condensate.

Cationic
- Cetyl trimethyl ammonium bromide.
- Tetradecyl pyridinium bromide.

Anionic
- Sodium salt of a sulphated cetyl-oleyl alcohol mixture.
- Sodium dioctyl sulpho-succinate.

Surface active agents are widely used as detergents, and as wetting, foaming, dispersing and emulsifying agents. Some are soluble in oils and rubber and others soluble in water. Some are capable of reversing the electric charge on surfaces. When used as emulsifying agents, for instance of oil in water, they concentrate at the interface or surface of contact between the oil and water and the hydrophobic tail is oriented and maintained within the oil, while the hydrophilic head turns towards the water. The emulsified oil particle becomes stabilised and develops an electric charge which promotes stability of the emulsion. When used in synthetic rubber drafting elements a similar orientation effect is obtained.

Surface active agents incorporated into synthetic rubber drafting elements provide many advantages now clearly established from operational mill tests, and undoubtedly this is associated with their influence at the surface of the rubber. At least three distinct advantages can be explained as follows:—

Cleansing Properties. Surface active agents are well-known as detergents and wetting agents and are widely used in cleansing. It is not just that they can remove an oily or greasy contamination film from the surface of the roller cover, which they are easily capable of doing — but rather that their very presence in the rubber actually prevents any tendency for such contamination to develop on the surface.

Prevention of "Licking." The surface active agent is oriented at the surface of the rubber. By the selection of a suitable agent, the surface can thereby be made to possess a negative electric charge which repels negatively charged fibres such as cotton and rayon. Fig. 1 shows the highly magnified surface of the rubber which incorporates a non-ionic surface active agent. The positive end of the long molecule is held in the rubber phase with the negative end exposed. This repels negatively charged fibres. Fig. 2 shows the use of a selected

(*continued on page* 244)

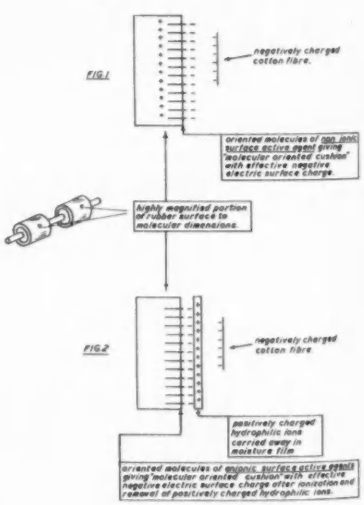


FIG.1
negatively charged cotton fibre.
oriented molecules of non-ionic surface active agent giving 'molecular oriented cushion' with effective negative electric surface charge.
highly magnified portion of rubber surface to molecular dimensions.
FIG.2
negatively charged cotton fibre.
positively charged hydrophilic ions carried away in moisture film.
oriented molecules of anionic surface active agents giving 'molecular oriented cushion' with effective negative electric surface charge after ionization and removal of positively charged hydrophilic ions.

The "Hartford" High Production Cotton Comber*

Main constructional features of a new machine—based on the well-known features of the original Nasmith comber—which is claimed to have greater production per unit area of floor space than any other contemporary comber

A REALLY high production comber is now available which is reasonable in price and simple in operation and is claimed to have the greatest production per head and per unit of floor area ever achieved. In the spheres of semi-combing or up-grading, this comber opens up new fields. Mills which up to now have produced only carded yarns will be able, at little extra cost per lb., to include a semi-combing operation. By this means the resultant yarn is appreciably improved in quality, or, alternatively, quality can be maintained while using a lower grade of cotton. The high output of the "Hartford" comber has considerably reduced the cost differential between carded or double carded yarn and semi-combed yarn and made the latter a much more attractive proposition for the average mill.

This 6-head comber will give high rates of production at relatively low running speeds. An output of up to 44 lb. (20 kg.) per hour can be achieved at a speed of only 116 nips/min.; a production rate of over 7 lb. (3.2 kg.) per head per hour. Laps of 20 to 40 dwt. per yard (34 to 68 gm. per metre) may be processed and slivers of 40 to 60 grains/yd. (2.8 to 4.25 gm. per metre) produced with either single coiling or bi-coiling. Operating with equal efficiency at waste extractions from 6% to 25%, it is eminently suitable for all classes of work, from super-combing through to semi-combing.

It will comb effectively laps made on any of the currently recognised systems of preparation. Although this comber has an exceptionally high production per head, this increase in output has not been attained at the expense of any deterioration in the quality of combing, as has been proved by lengthy tests at home and abroad. In designing the machine, special attention has been given to the need to produce a clean, regular sliver with the minimum waste extraction and the maximum efficiency of fractionation of short and long fibres.

Considerable thought has been given to ease of setting, and master settings for the simultaneous adjustment of all nippers and of all top combs are incorporated. No routine hand lubrication is required.

Production and Lap Preparation

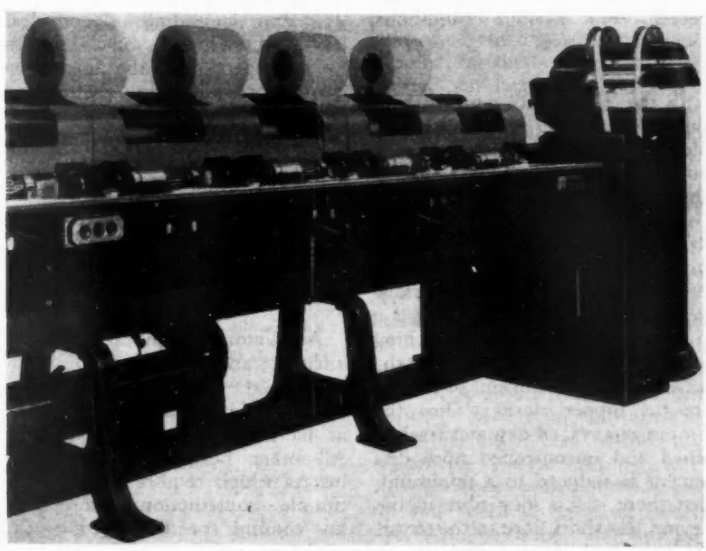
The maximum production rate depends on the method of lap preparation in use, as does the waste extraction necessary to give the required quality of combing from a given cotton.

With one drawframe/lap former preparation, production can be up to 34 lb. (15.4 kg.) per hour per machine. Similar production can be obtained with sliver lap/ribbon lap preparation, provided the laps are sufficiently regular. Production may be up to 44 lb. (20 kg.) per hour per machine with three drawframes /lap former preparation, since the improved parallelisation of the fibres in the lap makes longer feeds practicable at the comber.

On this latter system, equal quality can be obtained with lower waste extraction. As one example, using the sliver lap /ribbon lap system, a particular cotton combed at a rate of 34.1 lb. (15.5 kg.) per hour with 19% waste extraction gave the required quality. With three drawframes/lap former preparation, equal quality sliver was produced from the same cotton at the rate of 43.8 lb. (19.9 kg.) per hour with only 14% waste extraction.

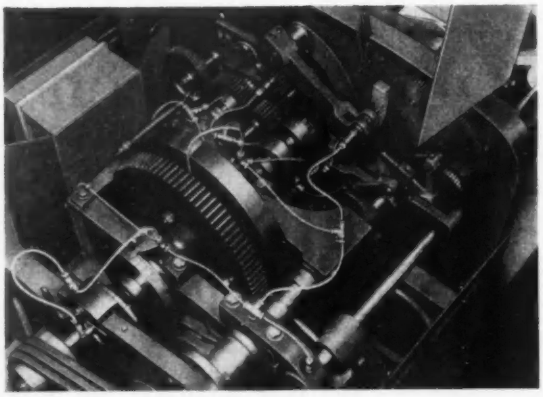
Machine Speed and Floor Space

The comparatively slow machine speed allows more time for the cylinder needles and the top comb to perform their functions than is possible on faster running combers. Consequently, a more gentle and efficient action takes place. In addition, of

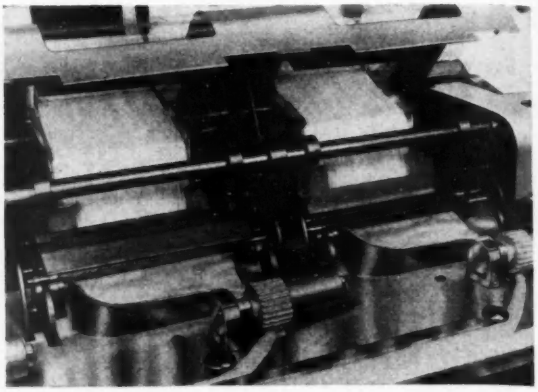


Front view of the new high production machine

* *Platts Bulletin, Vol. 9, No. 5.*



View showing the master setting scales for the top combs, also the tubing for the automatic lubrication system



Guard raised to show neatness of head mechanism. The detaching roller clearer and top comb have been removed from the right hand

course, lower speeds mean less wear and reduced maintenance costs.

With a 14 in. dia. coiler the comber is 15 ft. 2¼ in. (463 cm.) long and 3 ft. 7 in. (109 cm.) wide, thus occupying a total floor area of 54½ sq. ft. (5.05 sq. metres). This is the smallest space requirement of any modern comber and consequently it has a greater production per unit area of floor space than any other contemporary comber.

Efficiency and Quality

Other things being equal, running efficiency is inversely proportional to the number of heads per machine. For example, a 6-head comber would be expected to stop only two-thirds as often as an 8-head machine. Under particularly good operating conditions efficiencies of 95% to 98% have been achieved. For average conditions, efficiencies of over 90% can be expected.

With the "Hartford" comber, high quality sliver at high production rates results from excellent fibre control throughout the combing cycle, due to the balanced design of the component mechanisms. The top comb arrangement deserves special mention. It ensures not only a clean and swift entry of the comb into the fibre fringe as detaching commences, but also a deep penetration during the detaching period and a complete separation of the detached tufts from the end of the lap before the nipper closes. Thus the maximum removal of nep and trash is obtained and uncontrolled fibre displacement is reduced to a minimum, so that there is less long fibre in the waste and less short fibre in the sliver. Individual head sliver regularity is excellent, and variations from head to head, in respect of both sliver regularity and waste extraction, are extraordinarily low.

Drawbox, Settings and Safety

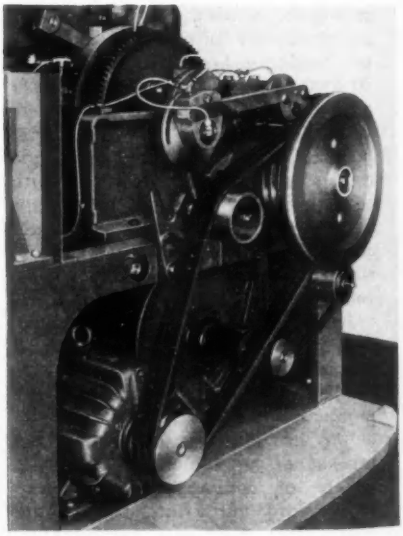
The drawbox is equipped with the 2 over 2 drafting system, which has been proved to be the most efficient method of minimising the effects of piecing irregularities and providing a very uniform sliver. It is simple in construction and requires little maintenance. All settings are exceptionally simple and easy to make and are positive; once adjusted they will remain fixed until the next resetting is required. As examples of the ease of adjustment, the detachment setting, i.e. nipper to detaching roller, can be altered without disturbing the setting of the top combs, while there is a master setting permitting the 6 top combs to be set or timed simultaneously, thus providing a considerable saving in time. This machine complies in all respects with the most rigorous requirements of the Factories Act, giving full protection to the operative. Smooth covers are provided for the headstock and drawbox gearing, while a guard is fitted to each pair of heads. Opening the gearing end cover or lifting a guard automatically stops the comber.

Lubrication, Maintenance and Power

An automatic pump ensures an adequate and controlled supply of oil at regular intervals to the heavily loaded and high-speed bearings and to as many other points as is practicable. All other bearings are fitted with inserts which require no lubrication. Simple construction, comparatively low running speeds, easy adjustment, ready accessibility to all parts, automatic lubrication and sound mechanical construction have resulted in a comber which requires little daily or periodic maintenance, thus reducing the upkeep costs to a bare minimum. A 3 h.p. motor only is required to drive this high production machine.

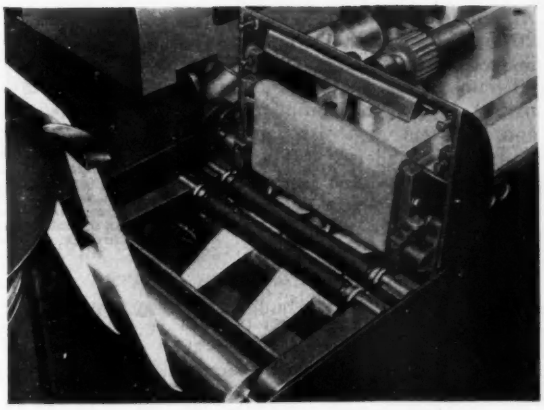
Machine Features

The design of the "Hartford" high production comber is based on the well-proven principles of the original model Nasmith comber; a universally-known machine with an outstanding record for quality of product. Redesign of the most important mechanisms, close attention to engineering detail, the introduction of anti-friction bearings and automatic lubrication, and the electrification of all stop motions and controls have resulted in



Drive by V-ropes from motor mounted inside headstock

an extremely simple, robust and quiet-running machine capable of processing heavy laps at moderate speeds. Built-in V rope drives are employed from the motor and to the easily accessible fan, while a chain drive is used to the brush shaft. Ball bearings are fitted to the driving shaft and fan shaft, and needle bearings to the V belt tensioning pulleys. Both fan and brush speeds are adjustable independently.



The drawbox with Platt 2 over 2 drafting system—a most efficient arrangement for combed sliver

Cylinders and Feed

Cylinders have 17 rows of needles. Due to the moderate speed of the machine, the needles pass through the lap fringe relatively slowly. Double feed rollers are employed and a uniform feed is ensured by special ratchet wheels. A new mechanism for opening and closing the nippers reduces strain on the nipper assembly and ensures that the maximum pressure is applied at the correct time in the combing cycle. The nippers are adjustable to the cylinder needles and are also adjustable, either individually or collectively, to the steel detaching rollers without disturbing the top comb setting. Provision is made for the quick release of the pressure on the top nipper jaw when it is necessary to remove the feed roller. Feeds of 0·21 in. (5·33 mm.) and 0·265 in. (6·73 mm.) per nip are recommended with sliver lap/ribbon lap or one drawframe/lap former preparations. With three drawframes/lap former preparation, feeds of 0·265 in. (6·73 mm.) and 0·32 in. (8·13 mm.) per nip are advised.

Top Combs and Detaching Rollers

A completely new arrangement gives better penetration of the top comb into the combed fringe. The top comb drive is semi-independent of the head mechanism so that its time of entry can be varied with much greater effect than on other combers. Waste extraction can be altered from say 12% to 20% by adjustment of the top comb timing only. This is a very useful facility, especially where semi-combing or upgrading is carried out. Top combs are suspended from a common rock shaft and are readily removed for cleaning. They are adjustable to the steel detaching rollers, individually or collectively, and also can be set for depth.

The steel detaching rollers are helically fluted. Back and front top detaching rollers are spring weighted, quick release mechanisms permitting easy removal when required. The arrangement to roll the top back detaching rollers partially round the surface of the bottom rollers permits a close approach of the top comb to the nip of the detaching rollers, thereby enhancing the cleaning action of the top comb. The top detaching rollers have synthetic coverings and can be supplied with needle roller bearings if desired. They are equipped with flat top clearers.

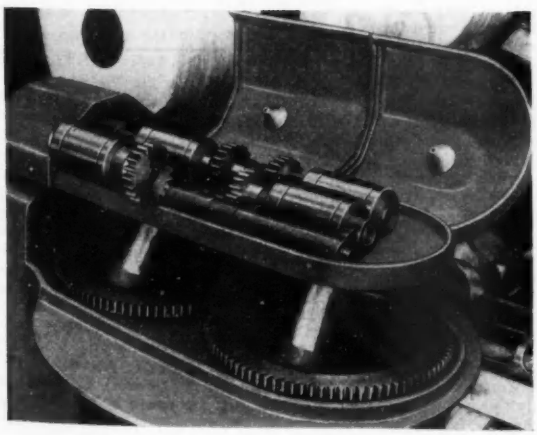
Sliver Regularity

Each head trumpet is offset to the side of the sliver tin so that the combed webs are condensed asymmetrically, thus dispersing the piecings and improving the regularity. To achieve maximum sliver regularity, special attention has been paid to the fluting of feed rollers, detaching rollers and the hinged, table calender rollers. The front table, guides, trumpets and waste presser rollers are chromium plated, while the lap conductor tins, web tins and brush tins are speculum plated.

Drawbox and Coiling

The drawbox is equipped with 2 over 2 drafting and the roller bosses are of a suitable width to handle the weight of sliver produced. We have proved conclusively after very extensive testing that this is the best system for drafting combed sliver. Top roller weighting is by spring pressure and a weight relieving motion is fitted. Needle roller bearings can be supplied for the synthetic covered top rollers. An Ermen clearer is applied to the top rollers, while the bottom rollers have a V-shaped clearer. There is also a clearer for the top drawbox calender roller.

Single coiling into 12 in. or 14 in. dia. cans or bi-coiling into 14 in. dia. cans can be supplied as desired. If bi-coiling is required, then the twin coil system (with two press wheels) fitted on this machine is more suitable for creeling at the subsequent drawframes than the twin sliver system (one press wheel), since no special device is needed to separate the bi-coiled slivers. The bi-coil motion reciprocates the cans through 180°. A two-tier coiler top simplifies piecing up and keeps the gearing free from fly. With bi-coiling, the two sets of slivers remain completely separated on the table and right through to the can.



For bi-coiling, two sets of calendar rollers and two tube wheels are employed in the coiler head. One calender in each pair is carried in a pivot bearing

At production rates lower than about 20 lb. (9 kg.) per hour, single coiling is recommended for slivers of 40 to 60 grains per yard (2·8 to 4·25 gm. per metre). For higher production rates and the same range of sliver weights, bi-coiling is advised. The comber waste is condensed on aspirator drums and may be collected on rollers or in tins.

Creel

With one drawframe/lap former or three drawframes/lap former preparations, the lap width is 9 in. and reserve laps are stored between the operating laps. This reduces the amount of lifting and reaching required by the operative and improves visibility in the combing department. With sliver lap/ribbon lap preparation the lap width is 10½ in. and an overhead creel is supplied. Laps up to 18 in. dia. can be accommodated. Piecing up of new laps is particularly easy on this machine.

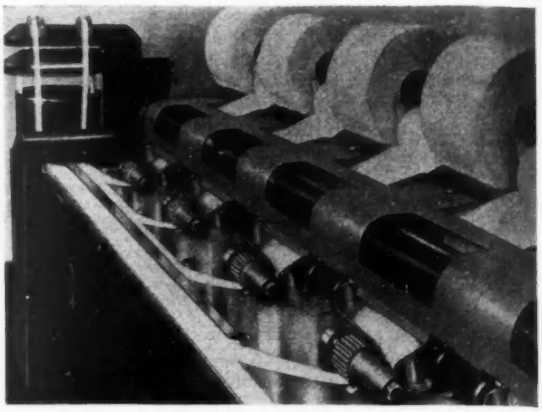
Stop Motions and Measuring Motion

Sensitive electrical stop motions, working on a 6 volt circuit and operating through an electro-magnetic brake, stop the machine for a full can, a detaching roller lap, a choked head trumpet, a lap on the drawbox front rollers, an end down between the drawbox and the coiler, or a lap on the coiler calender rollers. Warning lights indicate a full can or an end down. The electrical control panel is interchangeable with that on our drawframes and lap formers so that only one set of spares is required for these three machines.

Push-buttons for stopping, starting and inching are located at two convenient points at the front of the machine, while provision is also made for stopping the comber from the back. The machine cannot be started when the weight is relieved from the drawbox top rollers. A length measuring motion incorporating a 1, 2 or 3-shift counter is fitted.

Lubrication and Guarding

A cyclic pump, driven from the cylinder shaft, periodically supplies oil to a large number of the bearings in the machine, ensuring an adequate and controlled supply of lubricant at regular intervals. This reduces the time spent on maintenance. All the oil piping, with the exception of that in the drawbox gearing, is fabricated from transparent nylon. This material is less prone to damage than its metal counterpart, is simpler to apply and enables visual checks to be carried out to confirm that oil is in fact present in each pipe. Ball or needle bearings or inserts which require no lubrication are applied to all points not covered by the automatic system.



General view of the chromium plated front table. With bi-coiling, the two sets of slivers remain completely separated on the table and right through to the can

Covers totally enclose the headstock, including the hand wheel, but these can be opened to allow unrestricted access to all adjustment points. Opening the covers automatically stops the machine. Further covers are applied over the drawbox gearing and weighting system. A safety guard is provided for each pair of heads and raising one of these again stops the comber.

DRAFTING ELEMENTS

(*continued from page* 240)

anionic surface active agent, the molecules of which orient themselves on the surface with the hydrocarbon radical in the rubber phase and the hydrophilic end exposed. In the presence of moisture the molecules ionise and the positively charged hydrophilic portion is carried away leaving the rubber surface negatively charged. It will be seen that the surface active agent in fact provides what may be termed a "molecular oriented cushion" which is the effective drafting surface.

Prevention of Static Generation. Certain surface active agents are particularly efficient in preventing electric static effects. Normally when static occurs it shows itself as electrification of the sliver or yarn causing "licking" and "lapping" with the production of "fly" together with a "wild" hairy sliver or very bulky yarn. Static more often occurs when the relative humidity falls much below 50%, and although adequate humidification would solve the problem the installation of expensive plant is not always justified. In any case, it is not always possible to maintain a perfectly uniform and non-varying atmospheric condition at all essential points in a spinning room. Surface active agents can prevent static troubles for many reasons. Since they are wetting agents and lower the surface tension of a moisture film, they help to promote moisture absorption into the rubber. They may also increase the electric conductivity at the surface. We believe, however, that the molecular oriented cushion provided by the surface active agent prevents intimate contact between the fibre being drafted and the rubber, which actually prevents the generation of static charges otherwise formed by friction rubbing or separation of surfaces after intimate contact.

Whilst the Research team of George Angus and Co. Ltd. believe that the incorporation of surface active agents is a major contribution to the science of compounding synthetic rubber drafting elements, they do not think that complete finality has been achieved and their work is being actively continued.

One more recent development is already of great interest. Surface active agents can be incorporated with advantage not only in roller coverings but in synthetic rubber draft aprons. Aprons now manufactured by George Angus and Co. Ltd. not only incorporate surface active agents in the rubber phase, but the rubber has the form of a single homogeneous layer reinforced by stretchless "Terylene" cords completely embedded in the rubber. This is achieved by a new technique for which patent applications have been filed. These new aprons cannot delaminate and are completely free from air pockets.

AIR CLEANING EQUIPMENT. Intermit Ltd., European licensees of the Far-Air and Rotonamic air cleaning equipment, offer a loose-leaf catalogue which describes the comprehensive range of filters for conditioned air, for engine intakes, and other applications. The remarkable working efficiencies of these products are shown on graphs, and associated equipment is described. Far-Air and Rotonamic air filtration equipment loose-leaf catalogue is available free and post free from Publications Department, Intermit Ltd., 37 Bradford Street, Birmingham 5. The catalogue will be kept up-to-date by the supply of folders and sheets as additions or modifications are made to the range of equipment.

Use of Power Elements in Textile Plants

Older machines can in many instances be improved on, even modernised by replacing hand-operated mechanisms actuated by manual levers, etc., with power actuated machine elements

By L. WALTER, A.M.I.MECH.E.

RECENT trends towards making manufacturing operations more automatic has led to extensive use of power elements and servo-mechanisms. Simple automatic actuating devices, i.e., power operated equipment auxiliary to process machines has now become available in a great variety of designs. The subject discussed are simple power actuators which find a multitude of uses in modernisation of a textile plant. Manufacturers of textile machinery make use, of course, of modern power elements in their new designs. The great majority of textile machines in actual use in textile mills are, however of designs which have been evolved before the trend of automatic control became prominent. Many an older machine can be modernised by replacing hand-operated mechanisms actuated by manual levers, set screws, clamping fixtures and the like by power-actuated machine elements.

Mechanisation and Power Actuators

As an example how power actuators in modern textile machinery replace manually operated devices control of pressure of squeeze rollers should be mentioned. In order to apply a higher and better controllable force on machine rollers, pneumatic air cylinders find now wider use (see Fig. 1). To exert force on a calender roll for compressing material, either a friction brake arrangement working through two loggerheads, or a rack and pinion mechanism is in use. The oldest method of exerting force on calender rolls is to load it with weights. The forces applied are limited and the method is inflexible when a variable force is required. Smooth pneumatic load can be applied by installing individual regulators for each set of air cylinders permitting individual setting of roller force according to the fibres being processed. Pneumatic loading systems of cams, rollers or cylinders are available as standard equipment from reputable instrument manufacturers (Foxboro-Yoxall Ltd., Elliott-Bristol Ltd., and others). Equal loading of each side of a roll is thus secured. The exact pressure can be read on a dial pressure gauge. Adjustments are made by simply varying air supply pressure to the cylinders (see Fig. 2). The number of similar examples of reconstruction of existing textile machines are numerous, but in the following the general principles rather than detailed uses will be dealt with.

Mechanism in a textile plant can be considerably improved by using devices which perform handling operations, such as pulling or pushing, lifting and lowering of goods, of machine parts, or produce movement in machining or during manufacture in general. These devices are available under various names, such as industrial actuators, control power units, thrustors, power cylinders, or mechanical arms. Many an opportunity can arise for the progressive textile plant engineer to use one of these gadgets for making movement of goods either more precise, or easier for a plant operator. Simple power elements can frequently be used, for example, to relieve a worker entirely from continuous repeated strains. In addition to conventional lifting-tackle or mechanical-handling gear, actuators or thrustors are a most useful means

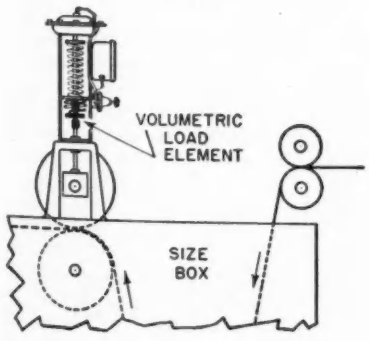


Fig. 1 (left) Controlled squeeze-roll pressure or tape frame sizing machine

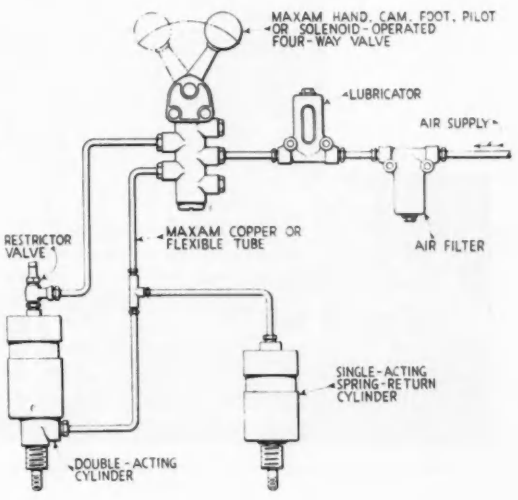


Fig. 2. (right) Fluid circuit for 2 Maxam air cylinders (courtesy: Climax Rock, Drill and Engineering Co. Ltd.)

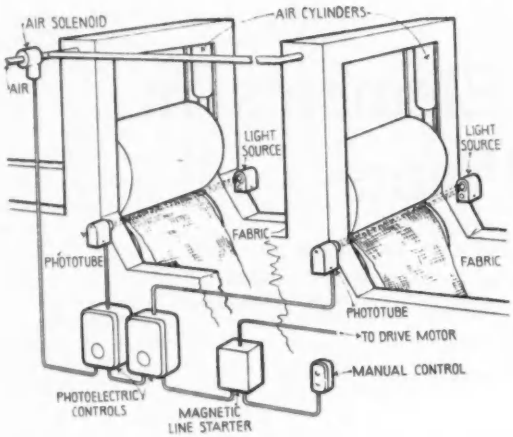


Fig. 3. (left) Air cylinders automatically lift squeeze rolls and stop drive by photo-electric control

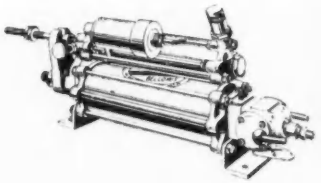


Fig. 5. (right) Air-hydraulic power pack cylinders in parallel (courtesy : Benton and Stone Ltd.)

for making certain shifting or lifting actions automatic. There is no plant today in operation which has not available an electric power supply. Many works have also compressed air ion tap, and water- or oil-operated thrustors produce their own power fluid by means of special small pumps ncorporated in their design.

Possible Applications of Power Elements

(Fig. 3)

Where compressed air or water under suitable pressure is piped through a works simple pneumatic or hydraulic equipment is available in a great variety of makes, which can be actuated by merely connecting a power unit to the fluid supply (see Fig. 3). Electric drive units, such as geared motors or motorised gearboxes and the like require only to be connected to the power supply by wiring or cable. In other conditions, electro-pneumatic or electro-hydraulic power elements require an electricity supply for driving an air compressor or an oil pump to produce the power medium. Amongst almost innumerable possibilities for their uses, the following lend themselves to pneumatic or hydraulic circuits incorporating power elements, valves and pipework: Remote control of mechanisms, including opening and closing of doors, windows, etc., operating clutches; clamping workpieces; operating power feeds; operating safety guards; operating hopper shutters; directional control of conveyors; air ejection; air hoists; lifting rollers; operating laundry machines; operating textile machines; automatic and semi-automatic sequences; mechanical handling equipment (see Fig. 4).

Control of pneumatic operation may be exercised by means of electro-pneumatic valves, by hand-operated pneumatic valves, or by an automatic circuit, which can be either electrically or non-electrically designed. The pneumatic control features may be a single handle, a lever or thumb switch, or a number of these may be assembled on a control panel or control desk for centralised supervision and operation. Remote control panels are applied to pneumatic or electro-pneumatic conveyor systems for guidance of the operator on a control desk.

Oil-hydraulic equipment is available for all forms of mechanical handling operations. Multiple control valves, pumps, hydraulic motors, piston cylinders and power packs (consisting of a motor-driven oil pump with auxiliaries mounted on a common chassis with all controls in a limited space), are available for the designer. The use of low-pressure systems using water as the working medium is often superseded by using oil as the working fluid at high pressures. The makers of oil-hydraulic equipment claim, as benefits to be derived from using oil under pressure as power fluid, that large forces can be applied through a variable distance at constant or varying velocity; moreover, these forces can be continuous or intermittent, and fine limits for speed and position control can be achieved. A great variety of hydraulic motor units are today available; amongst them are variable-speed rotary drives with mechanical efficiencies approaching 95%, with controllable torque throughout the speed range (see Fig. 5).

A very great number of examples could be given for practical uses of pneumatic power cylinders. For example changing a hand-fed machine into a fast semi-automatic unit in a plant can be accomplished if compressed air is on tap. Air cylinders work in dust-laden atmospheres if correctly built, and some makers claim high repetitive accuracy with push-button control. An application which seems to have most attractive possibilities in any plant is the wider use of pneumatic hoists. In these days of mechanisation it is incongruous for workers to lift heavy loads by muscular effort. A piece of rubber hose and an air hoist can do the job quicker and effortlessly. Where power

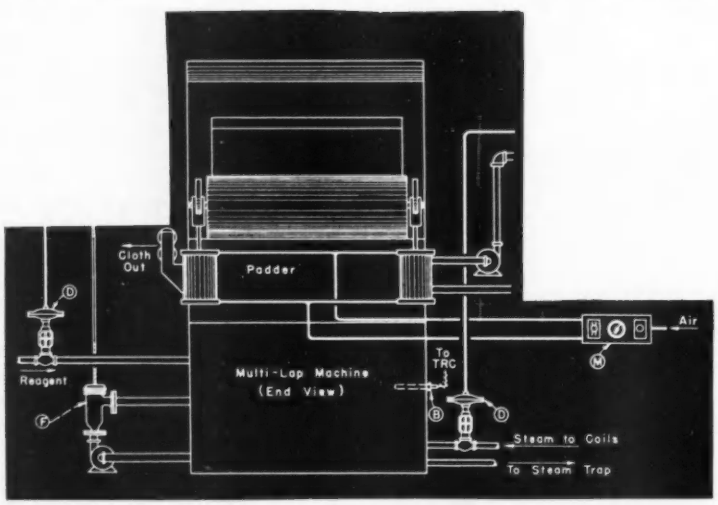


Fig. 4. Multi-lap machine control, using manual loading "M" and power cylinders

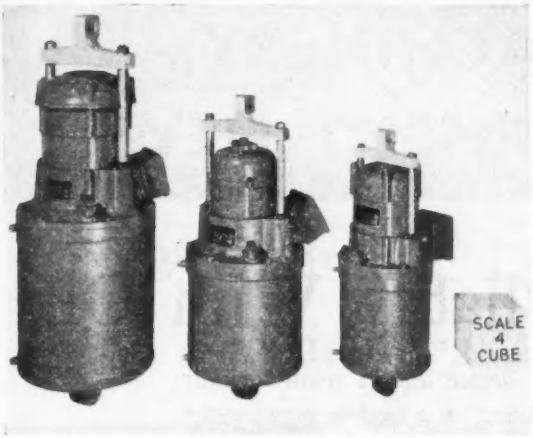


Fig. 6. Three standard sizes of B.T.H. electro-hydraulic thrustors. (courtesy: British Thomson Houston Co. Ltd., Rugby)

trucks (fork-lift, etc.) cannot be used, a pneumatic air hoist can solve many a lifting problem.

Simple movements achievable with pneumatic power cylinders are as follows: One stroke of a cylinder moves a full bin, then tips the contents in a hopper. Turning of a table or of a machine part may use a star-wheel mechanism actuated by a standard air cylinder. Jaws may be advanced to a pick-up position by a pneumatic power cylinder and closed either manually by pulling the lever of a control valve, or automatically by using a stop on a guide rod.

Electrical and Electro-Hydraulic Elements

Electrical power elements are well known and in common use in many forms. For the most parts they are motorised actuators which are easy to install. Speed control is, of course, required and often speed reduction units have to be used. A combination of motor drive, hydraulic pump and hydraulic power cylinder is widely used and known under the term of B.T.H. thrustor unit (see Fig. 6). From the inherent characteristic of non-compressibility of oil comes the advantages of high power, locking and repeatable positioning and speed control. A few typical possible thrust or movements initiated either by hand-control or automatically are shown at Fig. 7. An important feature of B.T.H. thrustors is that neither overload nor underload can cause damage to the power unit.

In conclusion it should be stated that the relative merits of electrical, pneumatic, hydraulic or electro-hydraulic power systems are not easily assessed. When mechanising an older type of textile machine in some instances an electric torque unit will be the best solution. In other instances a hydraulic system will be preferable or an electro-hydraulic unit will work satisfactorily. In general hydraulic circuits will work satisfactorily where small or medium force is required and is initiated by means of a hand lever. Pneumatic power systems have the advantage that they cannot freeze, and that leakages cannot cause damage. Introduction of gear type or of a rotary abutment type of oil pump (Keelavite system) driven by an electric motor greatly sponsors the use of hydraulic rotary motor units. Variable Keelavite electro-hydraulic speed drives are in use on web-tensioning and synchronising drives on textile machines for spinning weaving, raising, yarn-sizing, etc. Most advantageous use of this type of Keelavite rotary drive, made by Keelavite Rotary Pumps and Motors Ltd., occurs where close control of speed or torque is required, as an alternative to elaborate control methods.

Fig. 7

(a) Engine barring. The thrustor is controlled by pushbutton, which, with a flexible cable, allows the erector to inch an engine or machine round to any working point.

(b) Chute vibrator. One operation of the thrustor ensures that a hopper is completely emptied, giving uniform batches from the chute.

(c) Lay-shaft divides work for several operations, i.e., it may open one gate, close another, open valve, etc.

(d) Quick-acting vice for production work. Both hands are free and control is by foot-operated pushbutton.

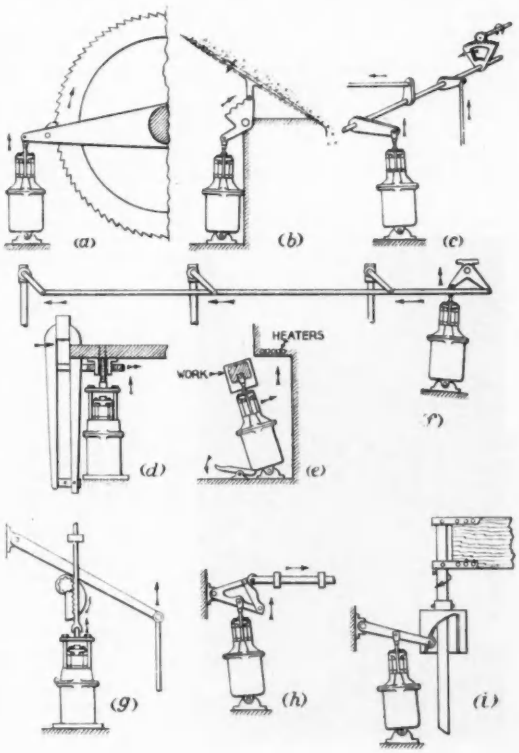
(e) Quick-acting press, shown working against hot surface for gluing on labels or box making (a similar arrangement may also be used for light stamping).

(f) Pusher rod for multiple and distant operation of a series of valves, etc.

(g) Graduated motion can be regulated by the shape of a cam.

(h) Thrust motions and "dwells" may also be regulated by cams; e.g., the thrustor may move one part of the machine, wait for a second part to act, and then complete the setting.

(i) Rotary motion can be secured by the use of a cylindrical cam.



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Winding More Pliably With Oil*

A very efficiently designed oiling device applies small amounts of oil to the yarn as it is being wound on a modern pirn winder

By Dr. ULRICH KUHN

FOR easily explained reasons coloured yarns are more difficult to wind than grey ones. After bleaching or perhaps one or more dyeing processes cotton yarns lose their natural waxes, woollen yarn their oils, and rayon yarns their original lustre. Moreover, the permanence of natural moisture is disturbed by artificial drying, which leaves the yarn brittle, strawy and rough. Black yarn is the worst in this category, for it often serves as an outlet for spoiled colour lots and has already been subjected to several chemical treatments, dyeing and dye removal, and repeated drying. While weft threads of this character have always been a plague for the winder, it is with the high-speed modern pirn winding machine that his efficiency falls.

The Oiling Devices

For their Autocopser ASE, Schlafhorst have discovered a means enabling such yarns to be wound at top machine speeds. An oiling device applies small amounts of winding oil to the yarn. The natural raw-yarn oil normally lacking is replaced by an oil that can be washed out afterwards. The yarn balloon strikes an oil-saturated wick attached to a tube filled with oil (Fig. 1) and the yarn thus conveys the oil to all tension and guiding elements, leaving them supplied with minimum deposits of lubricant. This leaves the yarn and all parts with which it comes in contact in a lightly oiled condition. The result is that bleached and dyed yarns can now be wound at speeds formerly found possible only with raw yarns. The number of broken ends is reduced by from 30 to 50%, the greatest reduction being with dark-coloured yarns because the high friction of these rougher yarns is removed. Oiling, of course, becomes more effective as the winding speed is increased.

For thread and coarse cotton yarn, oiling is of little advantage because they can normally be worked at high speeds without oiling. On the other hand, fine raw yarns of medium and inferior quality, which must be wound at a low yarn tension, can be worked to considerably better advantage with the oiling device.

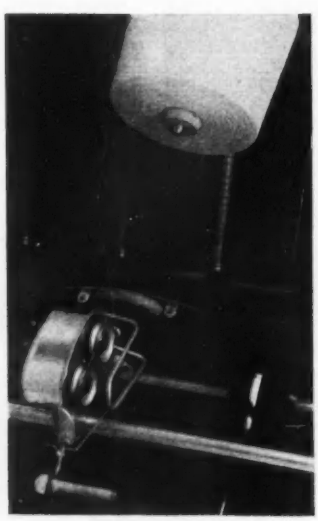
The oil tank on the machine—in the form of a long tube—is set horizontally, to allow the felt wicks to absorb oil equally; it should be wiped off every shift to remove the fly that naturally tends to accumulate there. The oil wicks are positioned so that the yarn balloons will just touch them tangentially when the packages have been unwound to their smallest diameter. If the oil tank and wicks are set too high, the yarn will tend to cut into the wicks and so be overcharged with oil. Depending upon the character of the yarn, the proper setting should allow it to take up about 0·01 to 0·1% of its weight in oil. Careful adjustment is especially important with rayon yarn, because an excess of oil can cause the pirns to slough off in the loom.

Added Advantages

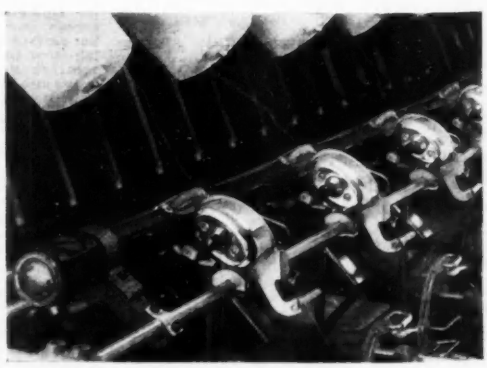
In addition to those mentioned for winding the pirns, the advantages that oiled yarn has in the loom should be noted. The yarn runs off the shuttle in oiled condition with less friction and fewer broken ends, because it is then more pliable. This, in turn, means fewer shut-downs in the weaving mill and fewer defects in the fabric. Moreover, the threads of the woof are struck home more easily in the warp; the weaving process is facilitated and runs more smoothly.

The quality of the oil is an important factor to the finisher of the goods. Oil should therefore never be applied to shuttle

* *Reprinted by courtesy of the author and "Textil-Praxis," Stuttgart S*, 1957, *No.* 7, *p.* 683.



(left)
Fig. 1. Oiling device on the Autocopser ASE. The yarn runs from the package over a wick impregnated with oil from a tube. As it leaves the package, the yarn strikes lightly against the wick, so that yarn and all yarn guiding elements are moistened with oil



(right)
Fig. 2. Another view showing four oiling devices in position

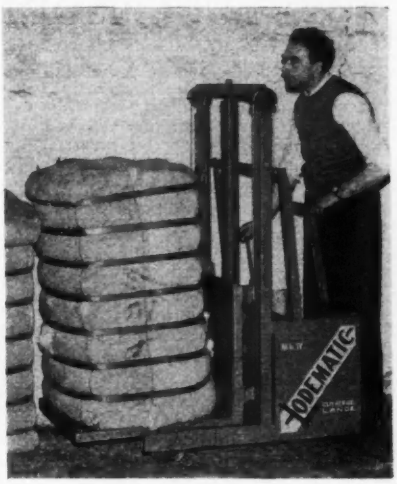
yarn that will not wash out readily afterwards. Schlafhorst specially recommend "Spulol W" (Winding Oil W) produced by Stockhausen and Cie., Krefeld. This oiling device has been developed by the American Schlafhorst Co. Inc., Charlotte, N.C., a subsidiary of the Gladbach firm. With this device, the American firm has been able to meet the severe requirements of the American textile industry. It has been tried out with success in the three-shift operation now usual in America. This oiling device has recently become available in Europe also and will now be attached to the Schlafhorst Autocopser on request.

New Hydraulic Lifting Machines

The new "Lodematic" loader shown feeding a pirn stripper, handles like a small sack truck, when telescoped

TWO new hydraulic machines recently announced by Lodematic Ltd., Clitheroe, Lancs, include the "Lodematic" vertical loader which pushes about like a small sack truck when telescoped, and is powered by "plug-in" electric motor. Yarn boxes, doffing skips and similar loads can be handled at high speed, and the loader can also be used for feeding pirn stripping machines and other in-process machinery. Other telescopic models which push like a small barrow are also available with up to 10 ft. lift, and operation can be automatic (actuated by load weight); semi-automatic (manual start/auto stop), and manual. If desired, the loads can be counted as they are lifted by counter attachment.

The "Lodematic" straddle stacker is a 5 ft. lift model for bales, cases and skips. Fixed forks, adjustable chisel forks or goods platform are available, and up to 12 ft. lift is available for lighter loads. Only 30 ins. wide, and of low unladen weight and telescoped height, the stacker can operate in confined space and on upper storage floors,



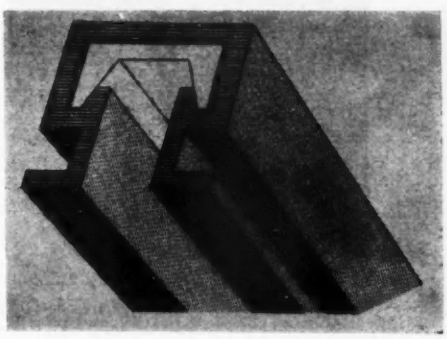
The "Lodematic" lightweight, hydraulic straddle stacker is powered by a "plug-in" electric motor

to which they may be transferred by goods lift. Lifting and lowering is by single "finger-tip" control, which automatically halts the platform when released. These inexpensive multi-purpose machines within their weight range can be applied to such duties as stacking, lorry loading and inter-floor use. A lightweight cloth bundle stacker is also offered. Only 2 ft. wide, and 5½ ft. high when telescoped, it lifts from waist height to 9 ft. or any intermediate level.

Safety Shield for Exposed Conductors

A NEW type of fully-insulated conductor, designed to prevent the possibility of shocks through accidental physical contact, has been introduced by British MonoRail Ltd. (Wren Works, Chadderton, Lancs.) for use on overhead handling systems normally using exposed conductor bar electrification. The conductor is a straight or curved length of channel section—¾ in. wide, ⅜ in. deep, and ⅛ in. thick—made of corrosion-resistant electro-galvanised steel enclosed in an extruded red p.v.c. sleeve of special design. The shielding is said to be foolproof in use—even a man's little finger cannot be inserted to make contact—but the efficient functioning of the sliding shoe connector is not impaired. The grade of p.v.c. used has a high dielectric strength, excellent resistance to a wide range of chemicals, and high physical strength.

A number of accessories have also been introduced, including p.v.c. safety covers, with provision for power feed, which clip over splices in the conductor bars. The system, known as Kant-Shock, is claimed to eliminate all risk of accidents so that many overhead handling systems now operating on 50 volts can change over with safety to higher working currents, with obvious economies. The company will offer the Kant-Shock shielded conductor for use with their own automatic transfer and overhead handling system, but it will also be available for use with other electrified systems using the standard-sized channel section.



The steel channel conductor of the Kant-Shock system is enclosed in an extruded P.V.C. shield: thus preventing shock from accidental physical contact

Portable Humidifying Appliance

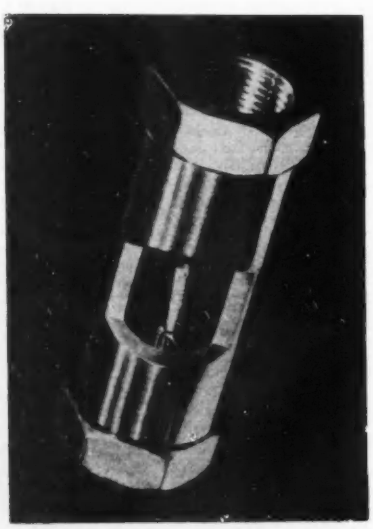
IN many continuous manufacturing processes, accurate maintenance of stable conditions in the materials involved is essential if maximum output is to be maintained. In processing cotton and wool, a high proportion of breaks can be traced to the adverse effects of unstable conditions of humidity. The problem of static electricity associated with man-made fibre processes is similar in origin. Correct conditions of relative humidity are essential in spinning, weaving, knitting, lace and net making, if necessary lost machine time and faulty goods are to be avoided.

The Defensor humidifier, a Swiss appliance available in this country from Fuel Efficiency Co. Ltd., 20 Upper Ground, London, S.E.1, employs the aerosol system for maintaining optimum conditions of humidity. Aerosols are minute particles of water which float like vapour into the atmosphere. The Defensor creates aerosols by atomising water and spraying these particles into the air, where they evaporate into the atmospheric humidity and distribute themselves evenly throughout the room space. The Defensor humidifier is light, portable, and plugs into any power supply and consumes only 75 watts. One is said to be sufficient to serve 10,000 cu. ft. of room space. A completely automatic system can be installed employing continuous water supply and hygromatic control.

Defensor humidifier

"Telicator" Flow Indicator

SIR W. H. Bailey and Co. Ltd., Patricroft, Manchester, have been appointed sole distributors for the flow indicating equipment produced by the Dukes and Briggs Engineering Co. This equipment at present comprises the "Telicator" visual flow indicators, although other models going shortly into full scale production will provide a full range to cover all requirements. The "Telicator" visual flow indicator, a compact unit designed for high or low pressure systems, can be successfully used for extremely high or low rates of flow at any viscosity. Comparative flow can be readily gauged by a glance at the rate at which the rotor is revolving—this rotor being clearly visible through its cartridge case. Reliability is afforded by the simplicity of the unit with its sprung jewelled bearings and strong metal external casing, and cleaning is facilitated by the design of the cartridge. "Telicator" flow indicators have applications in all branches of industry, including forced lubrication systems and water supplies for cooling purposes. Apart from the standard range for single- or multi-circuit indications, designs can be produced for individual requirements, while a special model is available for use with opaque liquids.



"Telicator" visual flow indicator

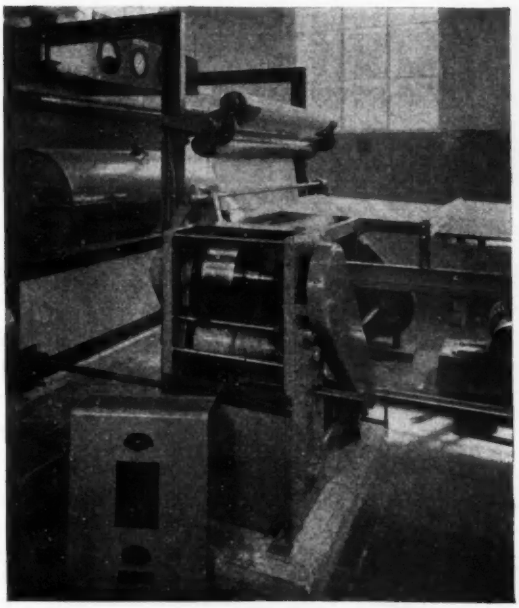
Non-Slip Surfacing

A NEW accident prevention aid marketed by Minnesota Mining and Manufacturing Co. Ltd., 3M House, Wigmore Street, London, W.1, is designed for factory floors, stairways, ramps and gangways. "Safety-Walk" Wetordry non-slip surfacing consists of extremely hard mineral grains surface-coated to a heavy tough fabric. Stated to be waterproof, weatherproof and unaffected by vibration, shock, heat, cold, oil and petrol, it can be applied to surfaces indoor and outdoor such as concrete, marble, terrazzo, tiles, wood and iron or steel plates. There are two grades—medium and coarse—for different kinds of traffic.

"Safety-Walk," which is available in green and natural black, is supplied in cleats of strips and in rolls; there are three types. *Type A* is for use on concrete and other rough surfaces where dust and moisture cannot be eliminated even during application. It is also resistant to all normal fire hazards. *Type B* is suitable for practically all clean, dry surfaces and *Type D* is "non-spark" variation of Type B, produced for highly specialised conditions such as the floors of chemical factories, etc.

3M "Safety-Walk" reduces slipping hazards to a minimum

Control of Warp Tension in Sizing

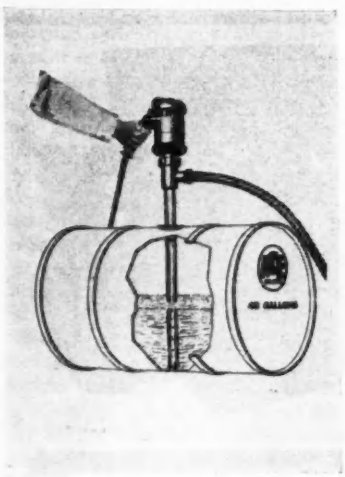


Zell tension regulator in position on the sizing machine

EFFICIENCY in warp production depends on several factors, not the least being accuracy in control of tension during sizing, drying and winding-on to the weaver's beam. Over-stretching must be avoided at all costs, whether in natural or man-made fibres, as the results of this are quickly translated into lower production arising from frequent end breakages during weaving and the possibilities of faults in the cloth which no amount of finishing will improve.

Designed to eliminate the adverse effects of varying tension on the warp, a new size box introduced by Maschinen fubrik Zell, J. Krückels, K.G., Zell, Wiensental, Western Germany, incorporates a tension regulating arrangement designed, the makers claim, to effect uniform tension of the warp sheet entering the size box in order to ensure perfectly sized yarns, even with tightly set warps. A special differential gearing in the regulator accelerates or retards the speed of the sizing rollers according to increases or decreases in the tension of the warp.

A roller under spring pressure transmits the tension to the regulating components of the differential gearing which automatically compensates for any variations in a sensitive and reliable manner. At the commencement of a new warp the desired tension is set by means of an adjustable slide and the amount can be read off on a large dial. Once the tension is set it should remain constant throughout the entire run of the warp. The differential gearing and cone drum drive are located in a common housing to protect them from dust. Carefully designed and constructed on the best engineering principles the wheels in the differential gearing and the cones revolve in ball-bearings. Pointing out that the regulator is easily fitted to existing Zell machines or to other makes, the manufacturers claim that it is only necessary to set the belt fork of the cone belt to the desired tension and the regulator then works entirely automatically. F. W. Young Yarns, Empire House, 175 Piccadilly, London, W.1, are the British agents for this machine.



A New Portable Self-Priming Barrel Pump

A NEW model to their range of portable electric barrel pumps is announced by British Central Electrical Co. Ltd., 6 and 8 Roseberry Avenue, London, E.C.1. Among the many features of the new pump is an increase in the maximum motor loading to 400 watts and the addition of a cooling fan which blows air over the motor casing whilst the pump is in operation. The lifting and inner tube containing driving shaft, for all lengths and types are easily removed and are interchangeable. Thus, the same pump can be used for water, oils, etc., and by replacing the lifting and inner tube assembly with one manufactured from austentic stainless steel, it can be used for acids or other corrosive liquids.

The lifting tube is easily inserted into normal barrel entries, as the overall external diameter is 1⅛ ins. and it is reinforced at the lower end to withstand rough use.

Self priming, the pump will operate against full pressure, i.e., when in use with the quick action tap at the end of the hose closed, it will continue to function without overloading. The pump is also easily dismantled for cleaning and sterilising the lifting parts, etc. which are in contact with the liquid. Power transmission is through an 0·2 in. driving shaft via a positive coupling. Should the pump be overloaded or over-heated (beyond 60°F.) by the liquid being pumped, a thermal overcurrent cut-out in the motor housing disconnects the supply until the pump cools. North country distributors are Caselco Ltd., 46 Park Square, Leeds 1, and Midland county, Selwood Engineering and Pump Co., 8a Solihull Lane, Hall Green, Birmingham 28.

1789

OBRIENS
'CALICO PRINTING'
DISCUSSES CROOKED WEFT

however be here faid, that the chief care is to keep the weft as much as poffible in the fame ftate as when woven, that is, in refpect to the direction of the threads; the omiffion of which, even when work is folded to go for fale, is evident in many patterns. As for inftance, if a piece be calendered fo badly, that the threads lay all very obliquely acrofs the table, and the pattern be of a fquare fet kind, it muft be clear that if printed on in fuch a ftate, and in the courfe of the following proceffes the cloth gets into its original ftate, the work will appear juft in the fame oblique direction, as the fhoot of the cloth did when it lay on the table; and inftead of the object being of a fquare kind, it will appear more like a diamond, which is almoft making a different pattern of it, and in the inftances of fmall fprigs or other fet objects, it muft greatly tend to throw them out of fhape and their proper diftances.

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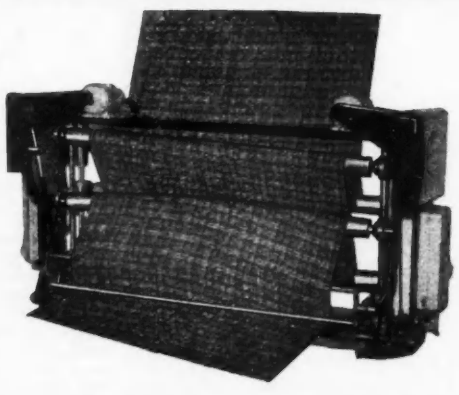

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The Application of Vat Dyes to Acetate Fibres

Many different useful dyeing techniques have been devised in recent years and considerable progress made in solving the earlier difficulties

By B. M. C. DORSET

APPLYING vat dyes to acetate fibres has occupied the attention of dye manufacturers and dyeing concerns for over twenty-five years. Vat dyes are so useful for producing very fast to light and washing shades on cotton and other cellulose fibre goods that it could only be expected there would be an incentive to apply these same dyes to acetate fibres. But one fundamental snag has been encountered. In the normal procedure for dyeing vat dyes on cotton use is made of a fairly strong alkaline dye liquor—the solubility of the dye demands such alkaline conditions—and thus the dye liquor is liable to saponify the acetate fibres during the dyeing process especially if this is prolonged or the temperature employed is relatively high. Such saponification leads to a loss of weight of the acetate fibre material which generally is not acceptable while it can also lead to harshening of handle and lower values in strength and wear. Although there are other problems associated with the application of vat dyes to acetate fibres the main one is that of devising conditions of dyeing which will ensure a stable dye liquor, the production of deep shades, and avoidance of any material degree of saponification. Despite twenty years research on this problem it cannot be stated that complete satisfactory dyeing of acetate fibres with vat dyes has been achieved although many different useful dyeing procedures have been devised. Recent progress suggests, however, that the problems involved are now considerably nearer solution.

In considering the progress so far made in dyeing acetate fibres with vat dyes it will be useful to note the chief features concerning both the dyes and their application to cotton and viscose rayon materials. The vat dye itself is usually available in powder or paste form consisting of particles which can, in some instances, be extremely fine so as to remain a long time in simple suspension in water. The dye particles are insoluble in water but, by reduction, can be changed to a so-called leuco form soluble in dilute alkaline liquors where the leuco form of the vat dye then exists in the form of its salt which may be sodium, potassium, ammonium, or an organic alkali according to the nature of the alkaline liquor. Of the different types of vat dyes some require a strong alkali for their solution (anthraquinone vat dyes are this type) while others are soluble in considerable weaker solutions (the indigoid are this type). The first type generally yields dyeings which have the utmost fastness. This is somewhat unfortunate since if the latter class were the faster then the fact that they only require weak alkalis for their conversion into a soluble leuco form would be more favourable to their employment in dyeing acetate fibres without saponification.

If a vat dye is prepared in its soluble leuco form with a strength of alkali less than that which experience has shown necessary then the dye liquor will not be satisfactory to use. It will be unstable so that dye precipitation may occur during the dyeing process and the absorption of dye by the textile material may be hindered so that weaker shades are produced. Such a dye liquor deficient in alkali may also give less penetrated dyeings. Thus it is not generally satisfactory to use too small an amount of strength of alkali. Vat dyes are sometimes applied to textile materials under special circumstances at about 95°C. but, in general, they are applied at temperatures of 20 to 60°C., the exact temperature used being governed by the particular dye employed. Vat dyes in their leuco form are liable to suffer decomposition if heated at about 100°C. and more so at higher temperatures such as used in dyeing synthetic fibres in closed dyeing apparatus. Vat dyes in their leuco form can be readily absorbed by cellulose fibres even within the low temperature range noted above. This should be favourable to their application to cellulose acetate fibres since less saponification is likely to be caused by the treatment of these fibres with an alkaline dye liquor if the temperature is relatively low.

In the early days of attempting to dye acetate fibres with vat dyes a common idea was to make use of the indigoid vat dyes (these require minimum strength alkali in the dye liquor) and to use as little alkali as possible. It was found, however, that although a weakly alkaline dye liquor could be used for dyeing, this relatively small amount of alkali could prove too small for actually bringing the vat dye (in leuco state) into solution. An expedient then adopted with some success was to prepare the vat dye solution with the aid of a comparatively large (the usual amount of alkali, i.e. caustic soda) proportion of alkali and then, when the vat dye was completely in solution, add a weak acid to

reduce by neutralisation the maximum possible amount of alkali, yet leaving sufficient alkali present to maintain the leuco vat dye in solution. Then by dyeing at the lowest possible temperature—say not above 30°C.—it was possible to produce dyeings without saponification. In the case of vat dyes which normally required a fairly strong alkaline liquor to maintain them in solution an alternative expedient consisted of adding sodium bicarbonate or boric acid (extremely weak acid-binding agents) instead of say sulphuric acid and thus leave some caustic soda or some sodium carbonate or borate in the liquor. In general all such expedients allowed the reasonably successful application of some vat dyes (notably the indigoid rather than the anthraquinone vat dyes) to acetate fibres but there was always the risk of the dye liquor falling into a bad state with partial precipitation of the dye through lack of sufficient alkalinity. It could not be claimed that such methods based on reducing the alkalinity to the minimum were reliable.

Further progress became possible when it was recognised that vat dye absorption could be considerably assisted by having present during the dyeing or printing operation a suitable proportion of a substance capable of swelling the acetate fibres to make it possible for the vat dye particles to enter the fibres more freely. Here it may be recalled that by the use of fibre-swelling agents it has proved possible to dye acetate fibre materials with other dyes including direct cotton and acid wool dyes within a few seconds. For example, by use of dye liquors containing around 50% or more of ethyl alcohol this high rate of dyeing may be easily achieved and yet produce dyeings having excellent fastness to washing. Obviously if vat dyes are applied with the aid of a fibre-swelling agent to allow such rapid dyeing, then it seems possible that saponification may be avoided even when the vat dye liquor is relatively strongly alkaline; the time of dyeing could be too short to allow the alkali to become appreciably effective.

Another line of progress has involved the use of organic alkalis such as pyridine which not only promote solution of the leuco vat dye just as does caustic soda but which also promote better dispersion of the dye so that it assists better stabilisation of the dye liquor and penetration of the textile material by the dye. Finally, with the discovery of new reducing agents which can be employed instead of sodium hydrosulphite it has become possible to apply the leuco vat dye under acid rather than alkaline conditions.

Recent Methods

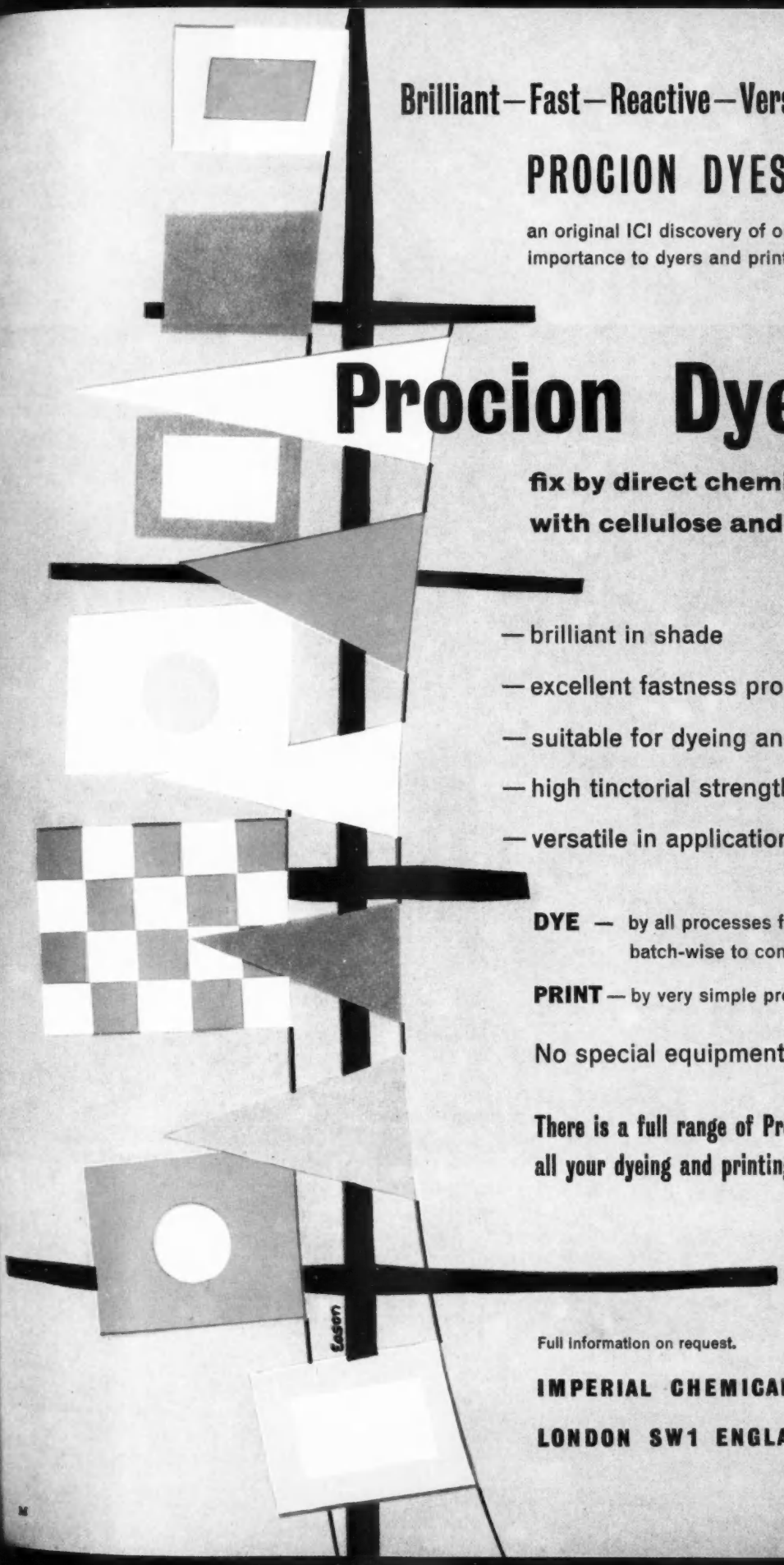
In considering some of the more recent improved methods for applying vat dyes to acetate fibre materials reference may first be made to a process discovered about ten years ago (B.P. 647,897). It is based on the use of a dye liquor which owes its alkalinity to the presence of an organic base instead of caustic soda, this base also having a swelling action on the acetate fibres; if desired there can also be present a fibre-swelling agent of non-basic nature. With such a dye liquor there is no saponification of the fibres and these are dyed extremely rapidly, but there is the possibility if the dyeing period is extended beyond 5 mins. and the textile material is manipulated in a slack condition to allow this to shrink considerably—the fibres may shrink up to 20% or more according to the conditions of dyeing employed. It is claimed that such a process allows cellulose acetate fibres to be satifactorily dyed with the anthraquinone vat dyes which give fast shades but are normally applied with the use of a high alkali concentration. For example, such vat dyes as Caledon Jade Green B, Caledon Brilliant Blue 3G, and Caledon Red X6B may be applied satisfactorily by this process.

The dyeing process takes the following form. Firstly say 0·6 parts of Caledon Jade Green B 300 powder are vatted with 0·8 parts of sodium hydrosulphite, 5 parts of pyridine, and 55 parts of water at about 50°C. The resulting dye solution is cooled, then 40 parts of diacetone alcohol (the additional non-basic fibre-swelling agent) are added and the liquor further cooled to 20 to 25°C. Acetate fabric is then dyed in this liquor for 5 mins., rinsed, oxidised, and soaped. If it is desired to use only pyridine as the fibre-swelling agent then the diacetone alcohol may be omitted and in its place should be used another 5 parts of pyridine.

A somewhat similar dyeing process (B.P. 647,898) discovered at the same time uses no organic base but rather a suitable amount of caustic soda or its equivalent of a salt (formed from caustic soda and a weak acid) which dissociates in the dye liquor to give alkalinity, and also a water-miscible substantially neutral fibre-swelling agent which may be the diacetone alcohol already mentioned above but which may also be reinforced by other similarly acting substances such as sodium thiocyanate or ethylene glycol monomethyl ether. Sodium borate is a suitable dissociating salt to use in this process and it is convenient to form it in the dye liquor as a result of vatting with caustic soda and then adding the equivalent amount of boric acid (slightly more acid may be added without adverse effect).

In a typical dyeing procedure, the dye liquor is first prepared by vatting 1·75 parts of Caledon Olive Green B 200 paste with 50 parts of water, 16·5 parts of 10% caustic soda solution, and 1·5 parts of sodium hydrosulphite, and then adding 675 parts of water, 109 parts of diacetone alcohol, 2·5 parts of the sodium salt of a condensation product of formaldehyde and naphthalene sulphonic acid, and 5 parts of Oranit BNX solution (an alkylated aromatic sulphonic acid) which act as dye dispersing agents, and 2 parts of sodium formaldehyde sulphoxylate (a reducing agent more stable than the sodium hydrosulphite). To the liquor is added 1·5 parts of boric acid dissolved in 50 parts of water. In the dyeing process proper, 20 parts of acetate fabric is worked in the dye liquor for 60 mins. at 55°C., then rinsed and oxidised by treatment for 30 mins. at 60°C. in a liquor containing 1 gram of sodium percarbonate per litre. The dyed fabric is then soaped from 30 mins. at 75 to 80°C. in a 0·2% soap liquor, and finally washed and dried. It should be noted that if sulphuric acid instead of boric acid is employed to neutralise the caustic soda then the resulting dye liquor is considerably less stable during use. This is true even if acetic acid is employed. In general the acid employed for neutralisation of the caustic soda should have a dissociation constant of less than 1×10^{-8}.

The vat dye liquors used as described above can have a pH of 8 to 10·5 according to the amount of boric or other acid added. Experience has indicated that in the dyeing of cellulose fibre materials there is but little dye absorption if the pH is below about 10·5 although acetate fibres can absorb the vat dye under these conditions of alkalinity. Thus the process allows the dyeing of cotton-acetate mixture fabrics so as to reserve the cotton while colouring the acetate fibres. This differential dyeing effect can be accentuated by having more of the fibre-swelling agent present so that the cotton can be reserved even when the pH is higher than 10·5. On the other hand, wool and silk dye readily at the lower alkalinity conditions. An advantage of the method is that it allows application of a wide range of vat dyes including many taken from the anthraquinone



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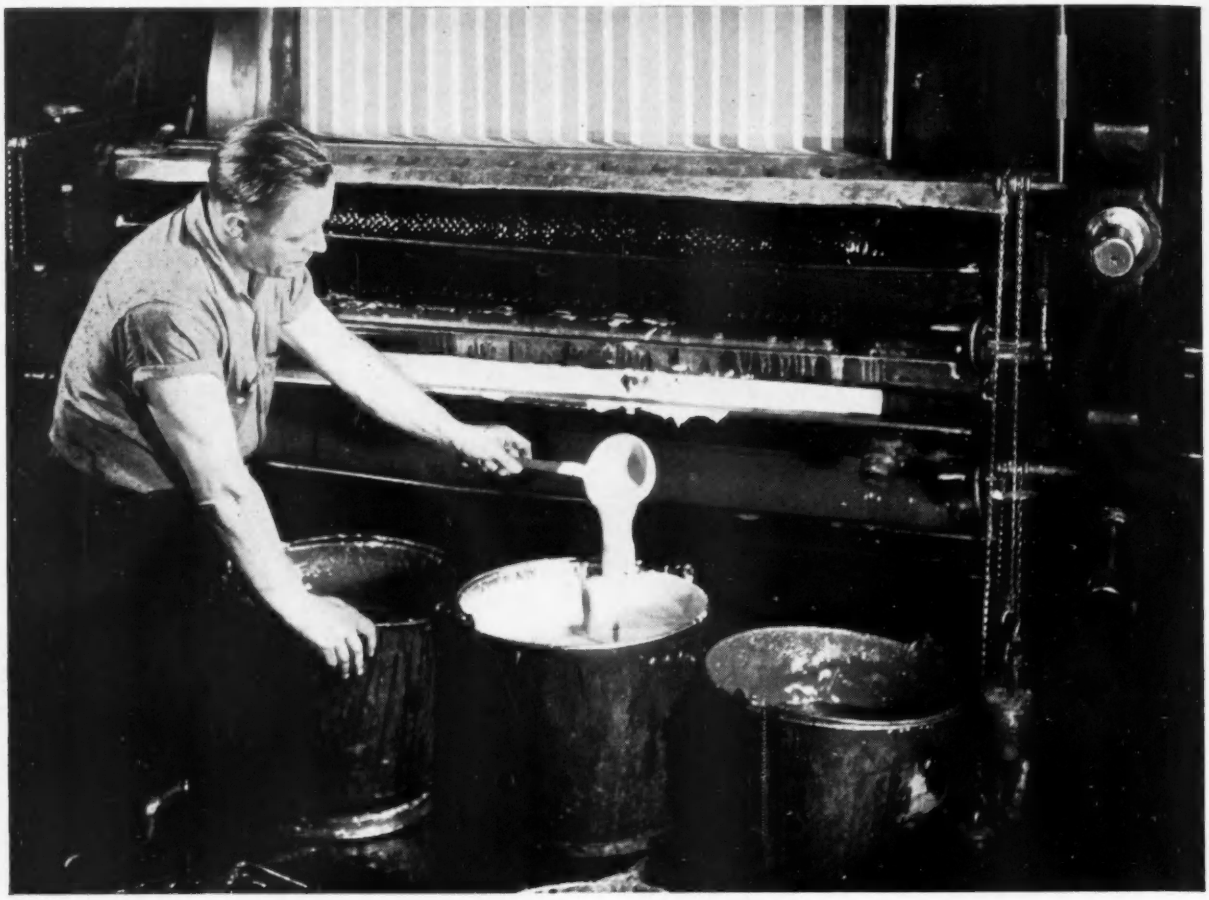

How to set the pace in fastness

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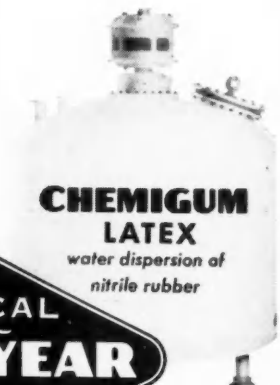

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group, which normally require the presence of a high proportion of caustic alkali in the dye liquor.

In the early days when the dyes for colouring acetate fibre without saponification were few, recourse was made to a method of dyeing in which pre-saponification was used to give the fibres a useful affinity for direct cotton dyes. The experience obtained showed that quite a small degree of saponification was sufficient to allow these dyes to be applied to give pale to medium depths of shade. It would, therefore, seem possible to aid the dyeing of ac etate fibre with vat dyes satisfactorily if just a moderate degree of saponification in the process was allowed and a high temperature of application used. In fact such a procedure (B.P. 681,654) equivalent to printing has been devised. It consists of impregnating acetate fabric with an alkaline liquor containing the vat dye in its leuco form, drying, then further impregnating the fabric with a more stable reducing agent such as sodium fromaldehyde sulphoxylate, then steaming the fabric in its wet state to fix the vat dye, and finally oxidising and washing-off. This method allows a wide range of vat dyes to be applied so as to have excellent fastness to light and washing and also be substantially fast to rubbing. In such a process the degree of saponification involved is such that the acetyl content of the fibres is reduced from say 54% to 50% and this can be tolerated since it does not appreciably thin the fibres or reduce their covering power in manufactured goods.

It should be noted that the vat dye liquor applied to the fabric contains no caustic alkali. The liquor is first prepared with caustic soda in much the usual manner but to it is added (after complete vatting) an amount of acetic acid which neutralises this alkali and liberates the leuco vat dye in a free dispersed state. At this stage sodium carbonate is added as a weak alkali to assist dye fixation with a moderate degree of saponification in the final steaming stage. The manner in which these operations are carried out is described below. The leuco vat dye dispersion is made with the following ingredients:

	parts
Indanthrene Red FBBA Double Paste	10
Caustic soda	5
Sodium hydrosulphite	5
Sodium formaldehyde naphthalene sulphonate (a dye dispersing agent)	5
Then is added	
56% acetic acid	15
Water	460

The above dispersion is padded into the acetate fabric (this may be a heavy weight or closely woven type yet acquire a uniform, well penetrated colouring) at 50°C. with the mangle nip adjusted to give a 50% liquor pick-up. The fabric is then dried and further padded with the following liquor:—

	parts
Sodium formaldehyde sulphoxylate	60
Sodium carbonate	60
Sodium alginate (a thickener)	3
Water	377

In this padding the liquor is held at 40°C. As the fabric leaves the padding mangle it is immediately (without intermediate drying) steamed for 5 mins. under a pressure of about 5 lb./sq. in. to effect dye fixation. Thereafter, the fabric is rinsed and treated with a liquor for 2 mins. at 50°C. containing 0·5% of sodium perborate to oxidise the vat dye to its stable insoluble state. A hot soaping completes the process and the fabric is left with a very satisfactory bright red shade involving a loss of only 4% of acetyl value.

In the above process use is made of the vat dye in its leuco state although this is present in the padding liquor not in the form of its water-soluble sodium salt but in the free water-insoluble but highly dispersed state. In recent years considerable success has been obtained in dyeing cotton and other cellulosic fibre materials with excellent dye penetration by a special method in which an aqueous suspension of the vat dye in its insoluble fully oxidised form is first applied to the textile so that this can then be further exposed to treatment with a reducing agent to effect a simultaneous reduction of the dye to its leuco form and the fixation of this. It might be expected that such a process could be adapted to dyeing acetate fibre goods with vat dyes. When such a process is applied there results but poor dye fixation and this is true even if there is also present a fibre-swelling agent such as sodium thiocyanate. But it has been found (B.P. 692,934) that if a hydroxy-alkylamine such as mono-ethanolamine is present also (caustic soda is not required but a small proportion of sodium carbonate can be usefully added) then dye fixation takes place satisfactorily and yet without any appreciable degree of saponification. Contrary to expectations triethanolamine is much less suitable than the mono-ethanolamine since it is liable to spoil the handle of the acetate fibre material. Usually a higher proportion of the hydroxy-alkylamine is required with anthraquinone than indigoid vat dyes.

Fixation

Vat dye fixation may be further assisted by having present a substance such as urea or diethylene glycol or thiodiglycol; the presence of a hygroscopic substance such as glycerol can also be beneficial. In a typical process an acetate fabric is padded with the following dye liquor.

	parts
Durindone Blue 4BCS	15
Sodium formaldehyde sulphoxylate	10
Sodium thiocyanate	15
Mono-ethanolamine	10
Water	25
30% British gum thickening	15
Urea	10

so as to allow an 80% liquor pick-up. The fabric is then dried, steamed for 40 mins. at 104°C., washed in cold water, oxidised at 60°C. in a 0·1% solution of sodium percarbonate, and then soaped for 30 mins. at 80°C. using a 0·2% solution. It is generally required that the hydroxy-alkylamine content of the applied dye liquor should not fall below 5% but subject to this limit the total amount of this dye assistant may be replaced partly by sodium carbonate—the higher the proportion of sodium carbonate used the greater will be the degree of saponification.

So far it would appear that the main essential to reduce saponification during the dyeing of acetate fibres with vat dyes using an alkaline dye liquor is that of having as little alkali present as possible. But there is the alternative of reducing the time of dyeing so that any alkali present will not have sufficient opportunity to exert its saponifying action. The time of dyeing can be shortened by having present in the dye liquor a strong fibre-swelling agent which will promote a very rapid absorption of the vat dye but it can also be made brief by employing a high dyeing temperature. This latter expedient can well be achieved by making use of the well known molten-metal dyeing plant which has proved so useful in the continuous dyeing of cotton fabrics with vat dyes. The period of dyeing can be reduced to about 5 secs., i.e., the period during which the dye-impregnated fabric occupies in passing through the molten metal bath. Actually it has now been found (B.P. 716,954) that acetate fibre fabric can be dyed with various types of vat dyes in much the same manner as for cotton using this special kind of dyeing apparatus.

The Standfast apparatus comprises essentially a U-shaped vessel containing a molten alloy (lead, zinc, cadmium, tin) which can be maintained at any suitable temperature up to 100°C. It is arranged so that the vat dye liquor floats on top of the molten alloy in one arm of the U-vessel while an aqueous solution of sodium sulphate floats on top of the molten metal in the other arm. It is generally advised that the vat liquor shall contain the vat dye in its leuco form and such a liquor may be prepared with:—

	grams/litre
Indanthrene Turquoise Blue 3GK ..	5
Indanthrene Navy Blue RB	5
Tinon Printing Black BL, 40% paste ..	15
Caustic soda	20
Sodium hydrosulphite	20
Calsolene oil (dye dispersing agent) ..	2

The acetate fabric, preferably heated by a preliminary passage over a few heated cylinders, is run downwards through the above liquor and the molten metal to emerge upwards from the molten metal in the other arm and the saline liquor floating over it. If the temperature of the molten metal is maintained at 90°C. the duration of this stage of treatment should occupy about 6 secs. The emerging fabric is then led through apparatus where it is rinsed, oxidised, soaped, rinsed and dried. Only a moderate and tolerable degree of saponification is produced. A useful advantage of such a method of dyeing is that it allows, in the one dyeing operation, mixture fabrics containing acetate with viscose or cotton fibres to be dyed a solid shade. A dye liquor prepared with:

	grams/litre
Caledon Jade Green XNS	100
Caustic soda	20
Sodium hydrosulphite	20
Methyl Cellosolve (fibre swelling agent)	50
Calsolene oil	2

gives a solid green shade on a 50/50 acetate-viscose rayon fabric when applied at 90°C. for 6 secs.

Reducing Agents

Over a period of many years the reducing agent almost exclusively employed in the preparation of reduced vat dye liquors has been sodium hydrosulphite; in printing processes where it is desired that reduction of the dye in the printing paste shall not take place until the steaming stage the more stable formaldehyde sulphoxylate is generally employed but this is only a special form of the hydrosulphite. In general the use of hydrosulphite reducing compositions requires the use of alkaline conditions. The introduction of a new reducing agent (thiourea dioxide) allows vat dyes to be applied under neutral and acid conditions and obviously this particular product can do much to assist the colouring of acetate materials with vat dyes without any saponification.

Thiourea dioxide (discovered by Barnett in 1910) is prepared by oxidising thiourea with hydrogen peroxide. In spite of this method of preparation it has neither oxidising nor reducing properties until subjected to conditions equivalent to those of steaming at about 100°C. when it changes to an unstable formamidine sulphinic acid which, by further decomposition, probably yields urea and strongly reducing sulphoxylic compounds. Thus if acetate fabric is printed with a vat dye paste containing thiourea dioxide and is then steamed the vat dye is reduced by the formamidine sulphinic acid (produced from the thiourea during steaming) to its free leuco state when it is absorbed into the acetate fibres. Acid rather than alkaline conditions exist during this printing operation so that no saponification of the acetate material takes place. It is to be noted that aqueous solutions of thiourea dioxide at 20 to 30°C. are acidic and have a pH of about 5. The relationship between thiourea dioxide and formamide sulphonic acid is shown in Fig. 1.

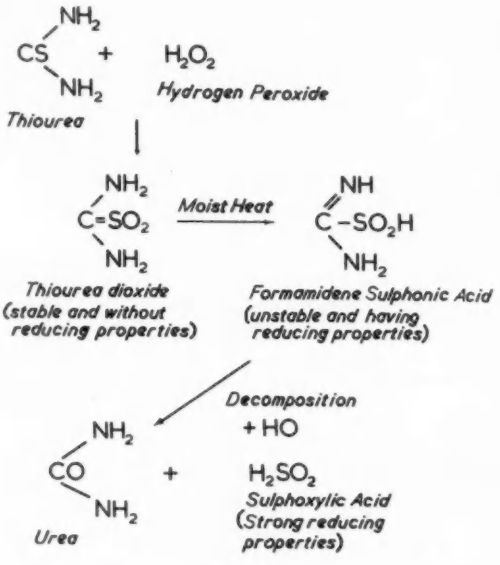

Fig. 1

Thiourea dioxide thus becomes important for acetate materials mainly in colouring these by printing methods and it has advantages over the hydrosulphites as mentioned above. Considerable use has been made of thiourea dioxide for applying vat dyes to acetate fibres and the experience obtained indicates that while a large number of vat dyes can be applied very satisfactorily some dyes are less useful. Thus while Caledon Blue XRC can be used for giving sky blue shades it is better for the production of deep blue shades to use Caledon Dark Blue G which is better absorbed by the acetate fibres. Krug (J. Soc. Dyers and Co., 1953, **69**, 606) has noted that the molecular structure of the vat dye plays a significant part in determining dye absorption. Thus while Algol Orange RF and Indanthrene Brilliant Pink R having symmetrical molecular structures shown in Fig. 2 do not give satisfactory colour yields when thiourea dioxide is employed as the reducing agent, Indanthrene Scarlet B having the non-symmetrical structure given in Fig. 3 is strongly absorbed by acetate fibres.

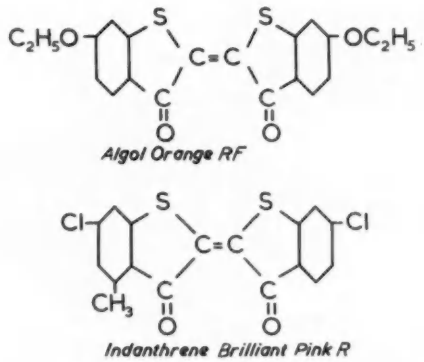

Fig. 2

Although dye selection is important it is possible by means of those vat dyes found suitable for application to acetate fibres with the use of thiourea dixoide to match all the shades which can be obtained with the use of the disperse dyes which are so much used today for colouring

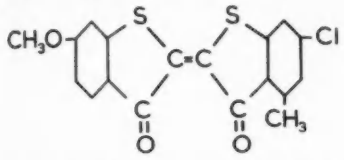

Fig. 3

acetate goods. Not only this but the fastness to light of the resulting colourings is just as high as the colourings produced with the same vat dyes on viscose rayon or cotton. One point here is important. The fastness to light of the vat dye colouring is much influenced by the final soaping treatment which is usually given to the coloured acetate material. It is essential to soap under conditions which bring the dye particles within the dyed fibres into their most stable condition. Of course, such soaping is also required as an after-treatment for vat dyed cotton and viscose rayon goods. To show how an unsuitably soaped vat dyed acetate fibre material may lack maximum fastness to light it is interesting to mention an experiment in which acetate fabrics dyed with Ciba Brown G were soaped at 50 and 70°C. The fastness to light of the resulting fabrics were 2 and 7 respectively, thus showing the benefit of soaping at the higher temperature.

It is generally advised to use a fibre-swelling agent in conjunction with thiourea dioxide so that dye penetration of the fibres may be suitably assisted. Combinations of polyethylene glycol and urea are recommended for screen printing, and polyethylene glycol and thiodiethylene glycol for roller printing methods.

Oxidation

The final oxidation of the printed vat dye acetate material is best effected with an acidified solution of sodium nitrite rather than with hydrogen peroxide or sodium percarbonate. It is an advantage attending the use of thiourea dioxide that in the final rinsing there is little possibility of loose dye staining the white ground—this arises from the fact that any excess of leuco vat dye is in the form of the vat-acid and not as its sodium salt. This preservation of a pure white ground is an important consideration.

Since the first introduction of thiourea dioxide commercially as Manofast various printing processes have been devised to apply it to acetate rayon materials and some of these allow discharge patterns to be obtained. In one method (B.P. 702,075) for preparing the printing paste the vatting of the vat dye with thiourea dioxide is effected under alkaline conditions using caustic soda and then the paste is made acid by addition of acetic acid in the presence of a gum tragacanth thickening paste. In a discharge printing process (B.P. 715,393) the acetate fabric is first padded with a typical liquor containing:—

	grams
Durindone Printing Blue 4BCS	15
Polythene glycol	8
Thiodiglycol	8
Thiourea dioxide	5
Aerosol OT	1
Water	53

and held at 40°C. The padded fabric is then dried in hot air and then is pattern printed with the following resist paste:—

	grams
40% formaldehyde	10
Water	30
60% British gum thickening of 50%	60

which may be coloured if so desired with a disperse dye. The fabric is then dried and steamed for 10 mins. at 100°C. with saturated steam. Thereafter, follows the usual oxidation treatment with acidified sodium nitrite solution, washing, and soaping at 70°C.

It has been mentioned above that thiourea dioxide as a reducing agent for vat dyes to be applied to acetate materials is more useful in printing than in dyeing processes but recently a discovery has revealed how such dyeing processes can be better controlled so as to be much more satisfactory. In the first place it may be recalled how acid vat leuco dyes can be prepared in the form of an aqueous dispersion by first vatting the dye under alkaline conditions with sodium hydrosulphite or formaldehyde sulphoxylate and then acidifying the resulting vat dye solution with acetic or formic acid preferably in the presence of a substance able to maintain the acid leuco vat dye in a reasonably stable dispersed state. Such a dye liquor can be used for dyeing various fibres including acetate and wool fibres, but in such dyeing two main difficulties are encountered.

One difficulty is that as prepared by acidification of an alkaline reduced vat dye liquor the acid leuco vat dye particles produced are liable to be coarse and are thus liable to settle when the liquor is held stationary. Such sedimentation appears to be more likely to take place when there is also present in the dye liquor a fibre-swelling agent. The other difficulty is that during the dyeing process with unavoidable exposure of the liquor to air partial oxidation of the acid leuco vat dye may occur and this may lead to dye precipitation with consequent uneven dyeing with poor dye penetration of the textile material; it is not possible to have excess of the reducing agent present.

The first of the above two mentioned difficulties can be overcome by using thiourea dioxide as the reducing agent since the use of this reducing agent leads to the production of a more stable and uniform dye liquor even when a fibre-swelling agent is present. The second difficulty remains since the thiourea dioxide is only slowly acting as a reducing agent under the dyeing conditions normally employed but it can be entirely avoided (B.P. 765,335) if thiourea dioxide is used together with a cationic surface-active agent since this combination very rapidly reduces any oxidised vat dye which tends to fall out of solution and which has been formed as a result of aerial oxidation of the dye liquor. Thus a satisfactory dyeing process has been devised in which the vat dye liquor is prepared with the vat dye and thiourea dioxide together with a cationic agent such as a quaternary ammonium (pyridinium or morpholinium) compound is present (e.g., cetyl trimethyl ammonium bromide, sold as Lissolamine A by I.C.I. Ltd). It is generally necessary to carry out vatting at not less than 60°C.

The following is typical of such a dyeing process in which acetate fabric is dyed with the well known vat dye Caledon Dark Blue GS. The dye liquor is prepared with:

10% of Caledon Dark Blue GS Paste (calc. on the fabric)
6 grams/litre of Lissolamine A
5 ,, ,, sodium phosphate buffer
2 ,, ,, thiourea dioxide
3 ,, ,, ethylene glycol diacetate

In this the vat dye is present in its acid leuco form. The acetate fabric is dyed in this liquor (ratio, fabric to liquor, 1/30) at 75°C. for 60 mins. Thereafter the fabric is treated with an oxidising liquor containing acidified sodium nitrite and is finally hot soaped. A bright royal blue dyeing is produced having excellent fastness properties.

Wet Treatment and Dyeing of Slide Fastener Tapes*

By H. W. PARTRIDGE, M.SC., F.S.D.C., A.T.I.†

SMALLWARES such as tapes and webbings form a specialised class, and the dyer finds it advantageous to dye the majority in hank form, although they are much heavier than hanks of yarn. Commonly 72 ins. in length, the weight depends largely upon the construction of the tape, e.g., ½ in. beaded qualities may be handled in hanks of 1½–2 gross yds. weighing 2–3 lbs. each.

The hanks usually arrive at the dyers in the form of bundles, and there is a tendency for the tapes to lie one upon another in a book form, and although this is less likely with beaded constructions, it is important that they shall be well shaken out to avoid penetration difficulties during dyeing. For a similar reason lease bands should be reasonably loose.

Medium and dark shades usually require only a preliminary scour or boil-out before dyeing, but for light shades and whites it is necessary to kier boil and bleach the goods. For this purpose the hanks are banded into loose bundles and are then loaded into a high pressure kier where they are boiled for 6 hours at 40 lb. pressure with caustic soda and auxiliary scouring agents, to remove the natural waxes, seeds and pectic matter from the cotton. It is important to ensure that all the air is expelled from the kier before raising the pressure, to avoid the formation of oxycellulose which would result in unlevel dyeing and possibly also tendering of the tape. During kiering the liquor is continuously circulated through the goods and through an external heater by means of a suitable pump.

After the kier boil the tapes are well rinsed, then "soured" in a cold, diluted solution of hydrochloric acid. This is usually accomplished by stacking the hanks in an acid-resistant brick vat and circulating the acid by an external pump.

Certain shades may be dyed on the kiered and acided ground, but for whites and pastel shades it is necessary to give a chemical bleaching treatment. This may be done either by cold sodium hypochlorite or hot hydrogen peroxide; the latter is more expensive but results in a better white. Whichever method is employed, strict control of the concentration and pH of the bleaching liquors is necessary to avoid damage to the cotton, and a sample of every bleach bath and souring liquor is tested in the laboratory before use.

The dyeing process is most conveniently carried out in stainless steel machines such as the Longclose "Hussong," the Pegg "Pulsator" or the Freeman Taylor "Centurion." The hanks are hung from stainless steel poles or bars suspended from the lid of the machine, and the dye liquor circulated by means of a propeller through a vertical compartment at the back of the machine. A perforated plate is interposed between the lid of the machine and the poles carrying the hanks to ensure even distribution of liquor. A typical machine of 480 galls. capacity is capable of holding 250 lbs. of tape per dye. Modern machines incorporate automatic controls regulating the flow of liquor. The Pegg "Pulsator" will pump the liquor for a predetermined time up through the hanks, lifting them off the pegs to ensure adequate penetration underneath the loops, then pause for a few seconds to allow them to settle gently back into place, and next reverses the flow of liquor down through the hanks for a further predetermined period, the sequence being repeated throughout the dyeing.

Other makes work on an automatic reversing system, and all types may be advantageously fitted with automatic controls, enabling the temperature of the dye liquor to be raised at a predetermined rate and maintained at the required level for a given time. At the conclusion of the sequence a red light will inform the operator that the machine is ready for attention. These machines are usually arranged in rows beneath an overhead hoist. As already mentioned the hanks are suspended from the lid of the machine by lifting the latter the whole load can be deposited in a rack suitably located alongside. After dyeing the hanks are hydro-extracted to remove surplus liquor and dried by hanging on wooden poles in a drying stove through which hot air is circulated. Alternatively, they may be dried over steam heated cans and wound on to large spools.

Class of Dye

For general purposes direct cotton dyes are employed. These are applied at the boil with additions of salt in portions to obtain adequate exhaustion of medium and dark shades. Careful selection of dyes is necessary to ensure that no change of shade occurs during subsequent processing of the fasteners, and a very high standard of matching is demanded in this class of work.

The direct cotton dyes include an adequate range of dyes of good fastness to light (Durazol, Solophenyl, Solar, Chlorantine fast colours) but most of the darker shades require some type of after-treatment to ensure adequate fastness to washing. Blacks and navys can be after-treated with formalin or, better still, diazotised and developed to form a less soluble and faster dye "in situ" on the fibre. Other shades are after-treated with one of the newer cationic fixing agents such as Fixanol P, Sandofix WE, Tinofix LW, Lyofix SB, Fibrofix, etc., in some cases with the addition of a copper salt which preserves the light fastness and further enhances the wash fastness. Where, however, the end-use of the fastener demands the highest possible fastness to washing, vat or azoic dyes are employed. The choice between a vat or an azoic usually depends upon the colour.

Vat dyes are, of course, applied at a lower temperature than direct dyes, usually at 50–60°C. Admixture of air with the dye liquor during its rapid circulation necessitates special care to ensure that the vat is maintained in a fully reduced condition, and in certain cases additions of anti-foam agents are required. After dyeing the development of the true shade takes place in two stages. First, oxidation of the soluble leuco compound to the insoluble dye, which may be accomplished by treating the dyed tape in a solution of a suitable oxidising agent, such as perborate, percarbonate, hydrogen peroxide or bichrome. Secondly, by a final boiling soap bath to ensure full development of the true shade and maximum fastness of the dye. These treatments involve substantial changes in colour and short lengths of tape must be oxidised, soaped and matched to the standard pattern before proceeding to finish the bulk load.

Azoic dyes are applied by treating the tape in successive baths of naphthols and diazotised bases, the dye being produced in an insoluble form by reaction between the two components on the fibre. The number of suitable combinations is, of course, limited, so it is not always possible to offer an exact match to a particular pattern which has been dyed with a different class of dye. A final soaping treatment is required to develop the true shade and maximum fastness of the dyeing.

Synthetic fibres will undoubtedly play an increasing role in slide fastener manufacture. Already the superior strength of nylon is being utilized in admixture with cotton and a proportion of 100% nylon tapes are also manufactured. When only a small percentage of staple nylon is incorporated as a fibre blend the staining of the cotton dye on the nylon may be adequate to produce a solid effect, particularly if the cotton dyes are selected with this end in view, but when nylon yarns are woven into the tape it may be necessary to match the nylon to shade by addition of disperse dyes to the direct cotton dyebath or to the soaping bath of vat and azoic dyeings. All-nylon tapes are dyed with disperse dyes for light shades and acid or premetallised dyestuffs for darker shades. As in the case of cotton tapes, the wet fastness of blacks may be improved by using colours suitable for diazotising and developing.

Certain problems are presented to the dyer by anodised fasteners. The tapes are dyed in hank form, but aluminium teeth are used in the manufacture of the fastener and these are subsequently anodised by the passage of an electric current in an acid bath and then dyed to match the colour of the tape. To conduct the current through the teeth during the anodising process fine aluminium strands may be woven into the bead of the tape and special precautions have to be taken in processing such tape to avoid the use of strong alkalies which would attack the aluminium.

* *From a recent paper to Derby Textile Society.*

† *Chief Chemist, Stevensons (Dyers) Ltd.*

The Conquest of Friction

Instrument making flourished in the 18th century as scientific experiment became fashionable, and practical use was now made of several of the anti-friction devices first proposed by Leonardo da Vinci two centuries before. Henry Sully's chronometer (put forward in the competition for the prizes offered in 1714 by the Board of Longitude) employed such bearings, and Attwood in his 'machine' for demonstrating and measuring the acceleration due to gravity also successfully borrowed one of da Vinci's devices.

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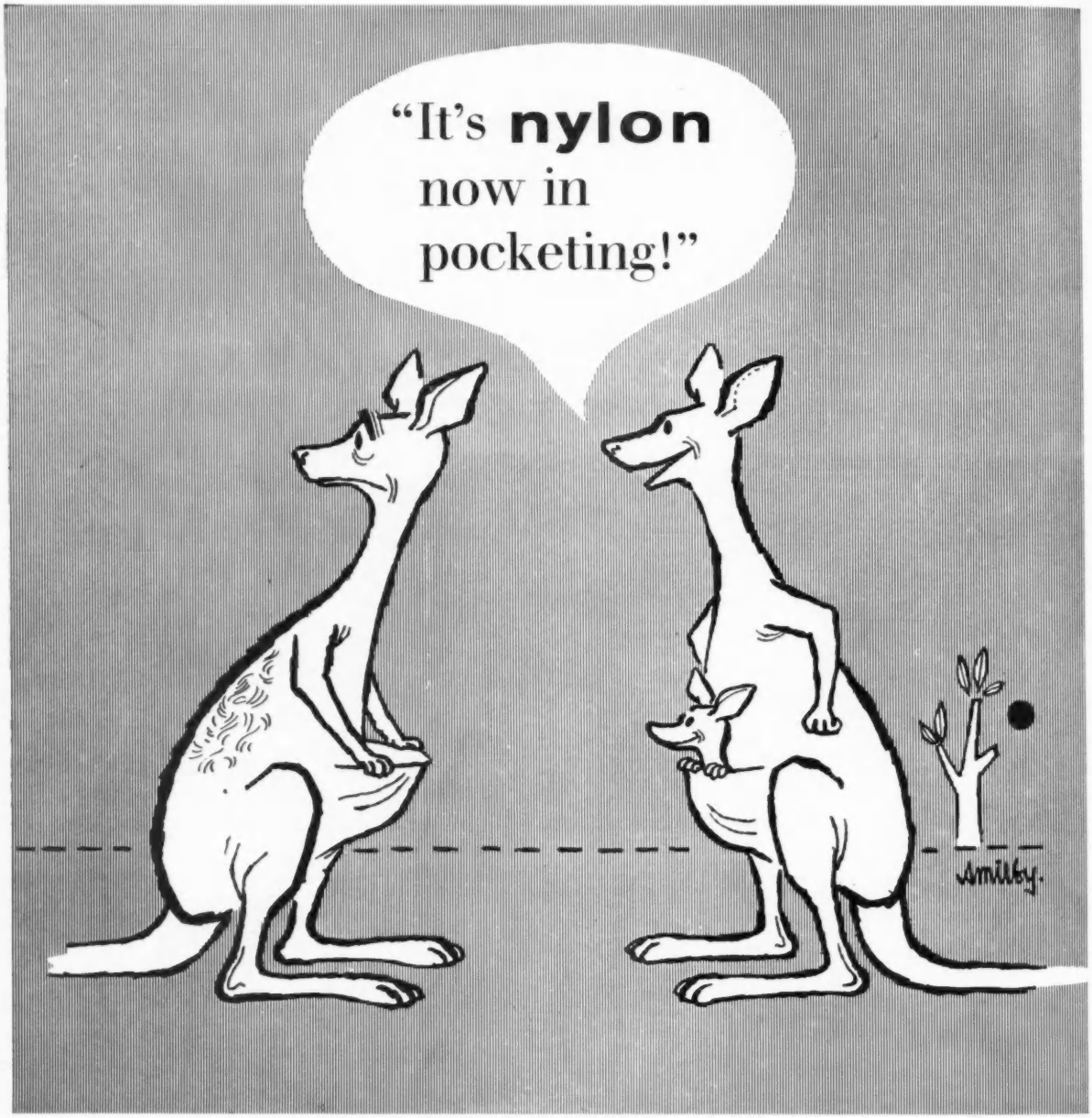

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Modern Textile Finishes

Abstracts from three excellent papers presented at a recent symposium organised by the Manchester Section of the Society of Dyers and Colourists

Flame Resistant Finishes

DISCUSSING flame resistant finishes, Mr. J. R. W. Perfect, B.Sc. (Technical Service Department, Proban Ltd.) in his address to the symposium, said that by flame resistant he meant something which charred on the application of a flame but which did not propogate flame. Certain phosphorous compounds had the property of making cellulose non-inflammable, he stated, and these compounds—apart from making cellulose flame-resistant—also made it resistant to glow.

Reviewing the various methods, he pointed out that one of the first was an ammonium phosphate-dycian chromide formaldehyde finish brought out in the late 1930's. Unfortunately, on drying, heating and curing, the ammonium phosphate decomposed, phosphoric acid was liberated and the fabric more or less decomposed as a result. A modification involved applying the pre-condensate to a cloth, drying, treating the cloth with alkali then re-drying and heat curing. This was applied to a limited extent to furnishing fabrics and canvas but the main disadvantage was undue stiffening of the fabric.

Another process was the urea phosphate method. In the 30's a great deal of activity had been undertaken in trying to make esters of cellulose and in 1949–50, a method of partially esterifying cellulose by the urea phosphoric method was developed. The flame resistant and glow resistant properties of this finish initially were excellent, but when one started treating with soap solution or with hard water, the flame resistance properties were reduced. But if one rinsed with ammonium chloride the flame resistance properties re-appeared.

Discussing the T.H.P.C. finish, Mr. Perfect said it was a case of reversing the usual procedure, for in this instance we had got hold of an American idea and developed it before the Americans. The T.H.P.C. or Proban finish as it was known in this country, was basically a thermo-setting resin finish. The handle could be soft or it could be firm depending on (*a*) method of application and (*b*) type of fabric to which it was applied. The tensile strength was little affected by the finish or only very slightly reduced. The tear strength was generally reduced but the extent depended greatly on the fabric structure.

It was possible to produce a satisfactory fabric with adequate strength and performance for its purpose with good permanent flame resistant properties. Being a resin finish it gave stability to the cloth, resistance to wet creasing and with suitable construction resulted in a drip-dry, minimum iron finish (a child's nightdress was shown as an example). Another property of the finish was that it imparted considerable resistance to rot. An example of this was to be seen in the experiments which had been carried out by burying fabric which had a Proban finish, in a compost heap. The fabric was undamaged, the tensile strength being unaltered after six months' burial. The types of fabric which could be treated with a Proban finish were virtually unlimited. There were limitations about fabric structure, but then this applied to any resin finish. In the main, the majority of cloths were suitable for the finish.

It had been suggested that a thermo-plastic phosphorous resin finish might be advantageous and one method suggested the use of brominated triallyl phosphate. A description was given of the preparation of this compound. Results were what one expected with a characteristic thermoplastic finish and 20–30% was needed for adequate flame-resistance. The handle could be modified if desired by plasticisers. The results were not entirely satisfactory and there was some doubt about the washing fastness. A further suggestion had been to combine a T.H.P.C. finish with this thermo-plastic finish, on the grounds that one would obtain the best of both, but this did not work out in practice and one impaired wash fastness of the T.H.P.C. finish without any compensations.

A recent promising line of approach was the use of trisaziridinyl phosphine, as an oxide (APO) or as a sulphide (APS) with T.H.P.C. This gave good flame resistant finishes with reasonable wash fastness, but it was not as fast, to severe alkaline scouring as the T.H.P.C. finish. However, one could get good flame resistance as little as with 7 to 8% solids which was remarkable for any flameproof system, but with that concentration the washing fastness was rather limited. With 14 to 15% wash fastness was better but then one started running into problems of strength and handle. This however, represented one of the most promising lines of approach for the future.

Society of Dyers and Colourists

Flame-Proofing Fabrics

ADDRESSING the symposium on the subject of flame-proofing fabrics with particular reference to the function of antimony compounds, Mr. E. G. Heighway-Bury (manager, Technical Service, Associated Lead Manufacturers Ltd.) pointed out that the requirements of an ideal flame-proofing process were numerous but could be summarised as follows:—

(1) A minimum "add-on" to avoid excessive increase in weight; (add-on meaning the increase of weight expressed as a percentage of the weight of the untreated fabric).
(2) Satisfactory handle of flame-proofed fabric.
(3) Ease of application.
(4) Permanent resistance to laundering and dry-cleaning.
(5) Freedom from deleterious action on the material.
(6) No decrease of vapour transmission such as might be caused by filling the pores in the fabric.
(7) No harmful physiological effects.
(8) The treatment should not increase afterglow (the flameless combustion of the residual char and sometimes of the unburnt material).
(9) Cost must not be uneconomic.

Referring to the testing of inflammability, Mr. Heighway-Bury observed that both the vertical test and the 45° test had their merits but observed that once a garment was well alight it would appear, except in the case of extremely inflammable material, only of secondary importance at what rate it would burn, if in the panic the wearer failed to take appropriate steps to extinguish the flame. The slower burning fabric would, of course, give more opportunity to control the fire provided immediate action were taken.

The problem of testing resistance to washing was considerably more difficult than testing flameproofness. In tests on fabrics flame-proofed by the "Antiflamm" process it had been found that materials could be boiled with soap and soda (5 gm. soap, 2 gm. sodium carbonate per litre, as

specified by B.S.S. for test of colour fastness) and still retain flameproofness when the fabric disintegrated.

However, a more realistic approach—one in which there was much mechanical attack—had been utilised and weekly commercial launderings for 10 months without apparent loss of flame-proofness had resulted. Discussing the extremely effective performance of antimony chloride produced *in situ* only at the ignition temperature of cellulose, he said that this certainly depended on the fortunate circumstances of its low melting and boiling points.

The formation of antimony chloride from the oxide and the decomposition of chlorinated body at the ignition temperature of cellulose could occur in several ways. There might be direct formation of antimony trichloride, or it might be produced by the effect of heat on an antimony oxychloride which might be the compound first formed. However, from a consideration of the various factors involved, it was clear that antimony chloride not antimony oxychloride was the active agent in flame-proofing.

The antimony oxide emulsion method of flame-proofing fulfilled a primary requirement of a successful commercial process in that it could be applied readily by normal textile machinery. The usual procedure was to pad on the emulsion and express the surplus by adjustment of the rolls of a mangle to give the desired wet add-on which was a direct function of the final dry add-on. The treated fabric was then dried and cured at 130–140°C. for 2 to 4 mins. Washing and treatment with an appropriate softening agent, if considered necessary, may then be carried out in any plant commonly used for these processes. In special circumstances the emulsion may be applied by brush or spray (i.e. the hessian backing of a carpet).

The add-on necessary for complete protection varied with the surface and weave. For example, with 14 oz. duck a 20% add-on was quite sufficient, increasing to 30% for 6 oz. drill to 40–50% for winceyette and even higher add-ons might be required with fine cotton nets. The cost was not necessarily higher per square yard when the "add-on" increased. These figures represented the add-on necessary for complete non-ignition by any test and retention of the flame-proofness throughout repeated washings during the life-time of the fabrics. Flame-proofness sufficient to meet less drastic requirements could be obtained with considerably lower add-on.

Regarding the influence of flame-proofing on strength, Mr. Heighway-Bury said that since in this process the fabric was at no time subjected to attack by acids no tendering occurred and, in fact, there was usually an increase in tensile strength which in some cases had been found to be as high as 15%.

So far as influence on colour was concerned, antimony oxide was a pigment of relatively high opacity and therefore some masking effect on highly coloured fabrics was unavoidable, but it only became noticeable in flame-proofing materials having large areas of dark colours or very heavy shades. Probably this could be mitigated by increasing the strength of the colour in the original dyeing or printing, or possibly by flame-proofing before colouring. With pastel colours and decoration with small highly coloured designs no deleterious effect was detectable. No chemical reaction occurred between the fire-proofing compound and any dyestuffs used such as vats or directs. The maintenance of acceptable handle was probably one of the most difficult problems encountered in permanent flame-proofing. The stiffness associated with a resin impregnation process of this kind did not appear to depend so much on stiffness of the impregnating compound as on cementing the fibres together at the point of contact. Thus materials of open weave gave much more satisfactory results than those of very close texture.

l. to r. H. Meldrum (hon. sec. S.D.C. Manchester Section), J. R. W. Perfect (Technical Service Dept., Silicone Processes Ltd.), J. W. Reidy (Chairman, S.D.C. Manchester Section), E. G. Heighway-Bury (Manager, Technical Service, Associated Lead Manufacturers Ltd.), Dr. G. W. Maderas (Technical Service Dept., Silicone Processes Ltd.)

Society of Dyers and Colourists

Use of Silicones

DISCUSSING the modern use of silicones in the symposium, on "Modern Finishes," organised by the Manchester and District Section of the Society of Dyers and Colourists, Dr. G. W. Madaras, B.Sc. Tech., (Silicone Processes Ltd., Bradford) said the methods of applying were (*a*) from organic solvent solutions, and (*b*) from aqueous emulsions. Both methods could be subdivided into:—

(1) Treatments requiring curing or polymerisation at elevated temperatures and

(2) Treatments carried out at ordinary drying or even at room temperature.

Examining the application of silicones from organic solvents, the treatment to include a baking or polymerisation step, Dr. Madaras observed that it was generally agreed that an application of silicones from organic solvent solution gave better initial water-repellency coupled with superior fastness properties than an application of the identical silicones from an aqueous medium. Advantages of the solvent treatment were applicability to all fibres without exception and no swelling of the fibres, hence no undesirable dimensional changes could occur. There was also no need for emulsifying agents, and hence no risk of back-wetting.

A recent development which gave satisfactory results consisted of combining an isocyanate treatment with the silicone process. This combination—for which patent protection had been sought—was in practice generally a two-step process but it was possible, at least on a laboratory scale, to combine it with the actual silicone treatment.

Speaking of silicones applied from organic solvent, but the treatment carried out at normal drying or even room temperature, Dr. Madaras said that a close look at the problem would indicate a variety of outlets for silicones applied to textiles and other substrates where recourse to a high temperature treatment was undesirable, if not impossible. By applying the right types of silicones (not the Si-H containing types) it had been found possible to prepare compositions in a suitable organic solvent of silicones and alkyl/titanates. These were perfectly stable to storage as long as moisture was excluded and merely required diluting with any

(*continued on page* 261)

Soiling of Carpets

This article is a later development of the paper given by the author at a recent symposium arranged by the Federation of British Carpet Manufacturers, and held at the British Rayon Research Association

By R. C. CHEETHAM, A.M.C.T., F.R.I.C.*

CARPETS, in common with all other fabrics, soil in course of wear but, compared with apparel, the effect is more pronounced since the amount of soil deposited is much higher and washing or dry-cleaning is less frequently carried out. Factors which encourage soil to remain on the pile are of particular importance.

The presence of oil or grease on the pile fibre is by general agreement a prime cause of high rate of soiling of the carpet. This oil may arrive on the pile fibres in various ways, for example "wicking" of oil from the backing yarns, contamination from tread, etc., or by processing oils from spinning; the latter has now been shown to be a very significant cause of soiling, more particularly for man-made fibres than for wool. The efficient removal of oil from man-made fibre blend carpet yarns is therefore essential, and everything possible should be done to produce yarns with low residual oil content.

Practicable measures of obtaining the desirable residual oil content after scouring include the use of easily removable spinning oils when processing carpet yarns on the woollen system. Such oils, sometimes described as "self-scouring" or "light-scouring," are based on mineral oil and synthetic detergents, examples being Pulwulol WNA (James Briggs and Sons); Mulsine HF (Benj. Vickers and Sons Ltd.) and Textoil (Textile Oils Ltd.).

Under favourable conditions yarns prepared with one of these oils can be scoured on conventional equipment with synthetic detergents such as Lissapol N, Comprox, or Teepol, with the further addition of sodium bicarbonate, if necessary. By these means recent trials with "Fibro" (Courtaulds' rayon staple) carpet yarns have given residual oil figures as low as 0·03% compared with 0·35% for a carpet wool prepared and scoured by conventional methods.

The trials with "Fibro" carpet yarns have further revealed that the soiling rate of the carpet is very high when the yarn contains an excessive amount of oil. Further, the soiling rate of such a yarn is only likely to be slightly improved by dyeing, and would be scarcely affected by a subsequent application of an "anti-soiling" agent.

Fig. 1 shows a carpet in which various undyed yarns have been tufted side by side to illustrate that an all "Fibro" carpet yarn, oiled with Pulwulol WNA and scoured with 2 gm./litre Lissapol N and 6 gm./litre sodium bicarbonate, has a soiling rate no higher than a normally oiled and scoured wool yarn. A similar yarn with an excessive amount of oil represents an extreme case which might be caused by an unsuitable oil or insufficient scouring and shows very high soiling, only slightly reduced by "blank" dyeing or by further application of an auxiliary agent recommended for "anti-soiling."

Fig. 2 shows a similar carpet after being piece scoured, indicating that removal of excessive oil reduces soiling rate, considerably and Table 1 gives the ether extraction figures for the various yarns:—

Table 1
Carpet Yarns Spun on the Woollen System

	% Ether extractable matter
A: "Fibro" carpet yarn with excessive oil content	2·4
B: After "blank-dyeing"	1·0
C: After "blank-dyeing" and further application of "anti-soiling" agent	1·1
D: "Fibro" carpet yarn spun with Pulwulol WNA and scoured with Lissapol and bicarbonate	0·03
E: Wool carpet yarn spun in the normal way and scoured with soap and soda ash	0·35

In these experiments the apparent soiling has been measured by the EEL reflectometer and the loss of reflectance has been taken to represent the degree of soiling. The rate of soiling is illustrated in Figs. 3 and 4 respectively, where *Apparent Soil* is the mean of 16 readings in each case. The carpet has been subjected to actual wear, the number of persons traversing the carpet being measured by a counting device. It will be noted that there is rapid initial soiling followed by a tendency for soiling to become stabilised. The general trend is similar in all cases.

A comprehensive range of products, claimed or believed to be soil inhibitors, has been tried but whilst some indicate a marginal effect under favourable conditions, none are effective when the carpet pile has high oil content. In addition to soiling by contact with dirt, a carpet may

* *Courtaulds Ltd., Droylsden.*

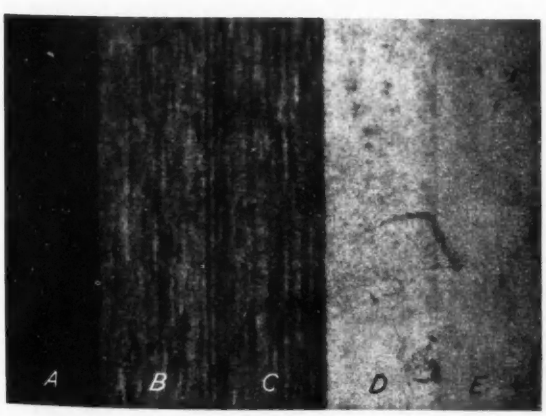

Fig. 1. Soiling of "Fibro" and wool carpets with varying oil content

Fig. 2. Soiling after piece scouring

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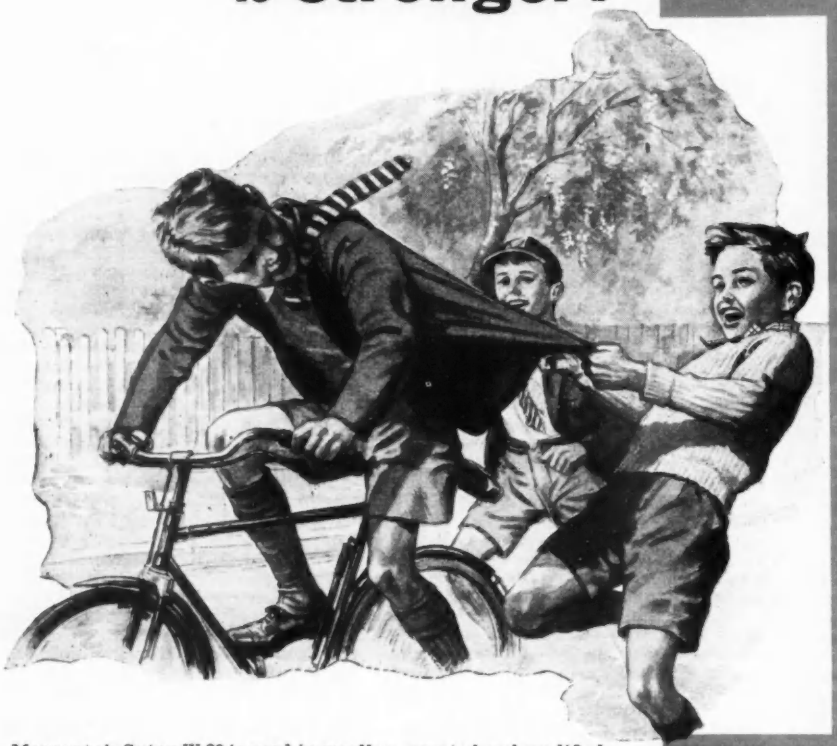

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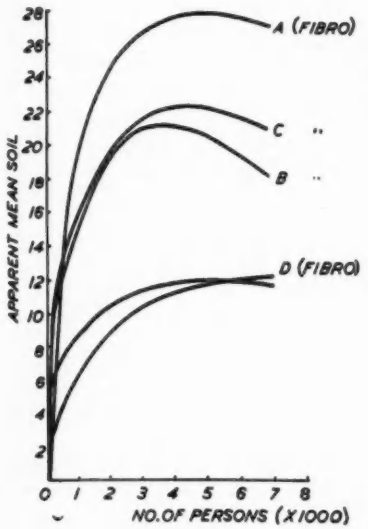

Fig. 3. Soiling rate of "Fibro" and wool carpet yarn

assume a darker or shady appearance by virtue of differences in light reflectance from the fibres in the pile; this effect is associated with the physical properties of the fibre and to some extent by the construction of the pile. The appearance of a carpet depends entirely upon visual estimation of the degree of reflectance of light and there is therefore a radical difference in appearance between bright and matt fibres. Length and density of pile and whether the pile is cut or loop also effect visual appearance. Generally speaking a close short loop pile of matt fibres show relatively less unevenness of shade on compression, and the so-called "non-crush" pile consisting of high twist yarns is even better.

Real soiling is governed by a number of factors, most of which are common to all forms of textiles but carpet soil is characterised by deposition of soiling matter to tread. If this soiling matter can be readily removed, preferably by methods other than washing a carpet can be expected to retain most of its original appearance. Regular and efficient mechanical removal of deposited soil will therefore contribute to a low soiling rate.

Other factors relevant to soiling include nature of deposited soil and in particular its particle size, airborne matter whether solid or gaseous, colour of the pile yarn and to some extent type of design, physical and may be chemical properties of the pile yarn, yarn constitution, moisture content and hence fibre regain inhibition, and lastly electrical state of the fibre. These factors have been given varying degrees of importance but it seems likely that fundamentally the rate of soiling will depend on the degree of retention of deposited soiling matter.

It should be obvious that colour will influence degree of soiling and this will operate for all fibres. In colour selection

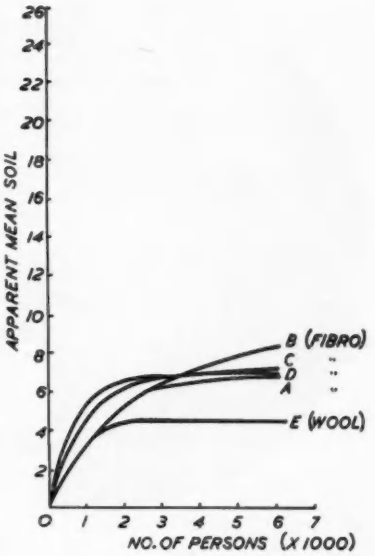

Fig. 4. Soiling rate after piece scouring

there will therefore be a compromise between the advantages of augmenting the possible colour range where certain man-made fibres are used and the desirability of restricting shades from a soiling point of view.

USE OF SILICONES

(*continued from page* 259)

suitable organic solvents before use. These diluted silicone/titanate compositions had a working life of at least twelve hours, frequently much longer. They could be applied to textiles and other materials, especially leather and footwear, by a variety of methods, e.g. padding, brushing, dipping, spraying, etc. The treated materials—be they tarpaulins, garments or piece-goods—then merely required drying which could be done in any conventional way, using any existing plant, or if so desired the material could be left to dry in air.

In connection with the emulsion treatment, Dr. Madaras said that nowadays reasonably stable textile emulsions were available and when supplied to the finisher, the silicone manufacturer provided the appropriate amount of the required catalyst (also frequently in the form of an emulsion). The use of CR resins was frequently possible with such emulsion, although some care had to be exercised in order to avoid fishy odours.

Whilst the marketing of cold-curing silicone solvent compositions had been a big step in the right direction, attempts at producing silicone emulsions which did not require baking had exercised the attention of silicone manufacturers and recently one large firm of silicone producers had developed a silicone emulsion which showed two very desirable features. First, the emulsion was substantive to wool and other protein fibres and secondly, no high temperature curing was required, the treated fabric merely requiring drying in any standard fashion. This development was of considerable importance to the wool industry, since it made it possible for the finest and most delicate yarns and fabrics, be they knitted or woven, to be treated with silicones on any existing plant, e.g. a dolly or a vessel were ideally suited for woollen or worsted piece goods. The silicone emulsion was mixed with the appropriate amount of catalyst solution, and the catalysed silicone emulsion was let down with water and added to the dolly or vessel.

The goods to be treated had previously been wetted out and the pH of the bath adjusted to between 4–6. After treatment the goods were hydro-extracted and then dried in any conventional way. It had to be realised that the water-repellency continued to develop after drying during storage and that the optimum effect was obtained after 10–14 days. This process which was available to finishers under licence from Silicone Processes Ltd., emphasised the unique character of the silicone/titanate system in providing the wool finisher with a simple method which fitted in with his normal processing and machinery, and imparted a high degree of water-satin repellency with the preservation of the handle and feel of the wool.

Glancing at the future, Dr. Madaras said that there was undoubtedly a demand for a cold-curing silicone emulsion which was applicable to other fibres, particularly to cellulosics and synthetics. Although no actual commercial process was as yet in existence, trials had been carried out with satisfactory results.

New Nylon Tubing

Tecalemit Ltd., Plymouth, announce a new range of nylon tubing which is made of light-weight, tough, heat and ultra violet light resisting material. Resistant to oil, grease and most chemicals, it can be used as lines for lubrication, hydraulic control, air, fuel and oil, chemicals, vacuum, coolant, etc. The Tecalemit tube is precision extruded to fine limits from specially compounded polyamides and two types are available—the semi-rigid (TTR) which is extremely pliable and easy to install, and the flexible (TTF). In both cases the tubing is said to be virtually indestructible.

The semi-rigid tubing—supplied in black—is heat-and-light stabilised to ensure that no degradation occurs when exposed to strong ultra-violet light or oxidation when working at continuous elevated temperatures over long periods, and is available in two grades, either high pressure with short time burst pressure rating of 2,500 p.s.i. or low pressure with a short time burst pressure rating of 1,000 p.s.i. Both grades are precision extruded and available with a range of outside diameters varying between $\frac{1}{4}$ and $\frac{3}{4}$ ins.

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Book Reviews

TEXTILE QUALITY CONTROL PAPERS, VOL. V. Textile Division, American Society for Quality Control, 161, W. Wisconsin Avenue, Milwaukee, Wisconsin, U.S.A. 131 pages (price $2.50 to members of A.S.Q.C., $5.00 to non-members.

As in previous editions of this publication the papers presented deal primarily with textile quality control from fibres to finished fabric. The following is a list of the papers included. What Management Expects from Quality Control (J. C. Martin); Army Quality Control and Inspection, a New Approach to an Old Problem, (Major General Webster Anderson); What Quality Control has Done for Our Mills, (L. C. Drye); Quality Control in the Garment Industry (R. G. Mitchell); How the Engineer Approaches the Problem of Quality Control (K. V. Chace); Canadian Yarn Survey—New Approach to Causes of Count Variation (G. M. Bornet); Quality Control Charts (Prof. D. S. Chambers); Quality Assurance to the Ultimate Consumer in the Textile Industry (J.B. Curley); Fundamentals of Quality Variation (K. K. Edgar); Planning and Analysing Experiments to Determine the Effects of Several Factors (Prof. R. J. Hader); The Analysis of Variance (M. C. Palmer); Non-parametric Tests (J. Krol); Quality Control of Knitting Operations (H. F. Littleton). A limited number of volumes III and IV of this publication are still available to readers interested in this important subject.

* * *

LABORATORY COURSE IN DYEING. By Dr. C. H. Giles. Society of Dyers and Colourists, 19 Piccadilly, Bradford. 1957. (price 17s. 6d.)

This manual describes a series of experiments illustrating commercial dyeing methods and gives an outline of the theoretical background. The author is senior lecturer in Chemical Technology, Royal College of Science and Technology, Glasgow, and this manual of practical instruction for the student of dyeing is the result of many years of teaching and lecturing to students on dyeing technology. Dr. Giles describes first the classification of fibres and dyes, some technical terms in dyeing, apparatus and materials, and laboratory techniques.

The core of the book consists largely of laboratory dyeing and test methods for dyeing cotton, wool, silk, cellulose acetates (including triacetate), nylon, polyester and acrylic fibres, and dyeing methods for fibre mixtures. There is also a description of semi-quantitative measurements of dyeing properties, experiments using absorptiometric colorimetry and spectrophotometry, and tests for fibre identification. An outline of the chemistry of dyes, fibres, and dyeing is given in the appendices, also chemical classification of surface-active substances, classification of fibres, and there is also a list of books for further reading. To the list of reference books on fibres "Technology of Synthetic Fibres" by S. B. McFarlane (Fairchild Publications, New York; 1953), and "Fibres from Synthetic Polymers" by Rowland Hill (Elsevier Publishing and Cleaver-Hume Press, London; 1953) should be added. This comprehensive laboratory course in practical dyeing should be found very useful for the student in the course of his studies, but also for the technician in dyeing establishments. The book is well printed and produced, and obtainable at a very reasonable price.

B.S.

* * *

TECHNOLOGY OF CORDAGE FIBRES AND ROPES. By D. Himmelfarb. Leonard Hill Ltd., 9 Eden Street, London, N.W.1. 1957. (price 35s.)

The book deals with the technology and manufacture of all kinds of cordage and rope. Man's social progress has been linked directly to the rope-maker who furnished first means for effective transportation to spread the cultural arts and to forward the military conquests which formed the stepping stones to our modern world. The author of the book is a technologist and master ropemaker, U.S. Navy Ropewalk. He describes the classification. use, structure and properties of cordage fibres, their processing and grading characteristics; also the preparation of the fibres for spinning, twisting, laying and braiding, and the finishing operations, such as dipping and saturating treatments, tarring, drying, polishing, hanking, randing, and impregnating methods to render rope and cordage water-repellent. He then deals with principles of quality control, standards and tolerances for rope properties, standards for thread rope machine operations, production control and analysis, and with physical testing methods. There is also a section on protection of ropes against environment deterioration, weather degradation, storage and microbial deterioration, and identification methods of rope, cordage and twine. The use of man-made fibres, and the effect of nylon and "Terylene" for cordage yarn twisting is also described. The book is written in an authoritative style, and is annotated with 39 illustrations and more than 90 tables. At the end is a well compiled index. It fills a gap in the existing literature and can be highly recommended.

B.S.

* * *

SCHLICHTEN FUER BAUMWOLLGARNE. (Sizes for cotton yarns.) By W. Rohs and Dr. I. Geurten. Westdeutscher Verlag, Opladen and Koeln. 1957. Pp. 56 (price DM 23.70).

This report gives details of an extensive series of laboratory experiments undertaken by the Bast Fibre Industry Research Institute, Bielefeld, to determine the effect of traditional and modern sizing materials on certain properties of cotton yarns. The sizes were applied on a experimental sizing machine with a hot-air drier attached to the machine. Altogether 88 different size recipes were employed to determine the effect of both adhesives and lubricants. The principal traditional adhesive used was potato starch, the effect of which was compared with various modified starches, C.M.C. (carboyl methyl cellulose), gelatine, and acrylic size materials of various kinds. These were applied to coarse, medium and fine counts of grey cotton yarn, and to a coarse count bleached yarn. The yarns were tested before and after sizing, and after scouring, for breaking length and extension, size viscosity and penetration being examined. No weaving trials were made. It is concluded that for reliable results a size mixture should have a low and stable viscosity as well as definite ability to penetrate the yarn.

B.S.

* * *

REGISTER OF EX-APPRENTICES AND EX-TRAINEES. Metropolitan-Vickers Electrical Co. Ltd., Trafford Park, Manchester 17.

To have been responsible for the technical training of well over 13,000 men and women from 1902 to 1956 is a record, probably unsurpassed, of which any industrial organisation may justifiably be proud. The chief feature of the volume is the alphabetical register, which records some biographical details for each person, the principal events in his training and subsequent employment and his latest known address. This last-mentioned item may well lead to the renewal of many lost friendships. The geographical index gives the distribution of ex-apprentices by localities both for this country and for the continents of the world and is accompanied by maps and charts showing the numbers of ex-apprentices from all countries and also the number now resident in those countries. The names of ex-apprentices and ex-trainees are also arranged in the chronological index in order of the commencement of their training at the various M-V. works. A chart is included in this section to show, as a five-year sliding average, the number of apprentices who have completed their training each year. The compilers are to be congratulated on their work, which illustrates in no uncertain manner the global influence of M-V. training.

* * *

METHODS OF TEST FOR FLAMMABILITY OF FABRICS. British Standards Institution, 2 Park Street, London, W.1. (price 4s.).

This new British Standard (B.S. 2963 : 1958) prescribes methods for determining the flammability of any fabric except flameproof types (for industrial clothing) which are dealt with in a separate specification. The new standard is based on recent experimental work by members of the Textile Institute committee responsible for the document and provides a method of expressing flame-resistance by numerical rating.

* * *

DIRECTORY OF BRITISH RUBBER MANUFACTURERS AND PRODUCTS, 1958 EDITION. Federation of British Rubber and Allied Manufacturers, 43 Bedford Square, London, W.C.1.

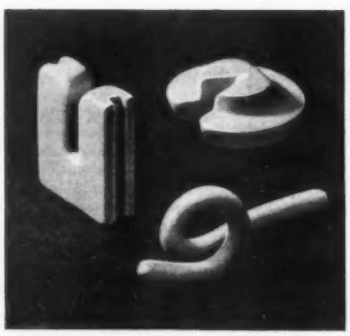
The F.B.P..A.M. is a unifying body having 23 Trade Association members, each caring for a specific branch of the industry, and also has a class of Associate Members formed from suppliers of machinery, materials and components. The directory consists of an Index to Manufacturers with, in many cases, a list of their overseas distributors, and an Index of Products, linked to a classification of over 600 rubber products, which is repeated in French, Spanish and German. There is also a special section for the tyre industry. The directory is well designed for ease of reference and is attractively produced.

S.P.S.

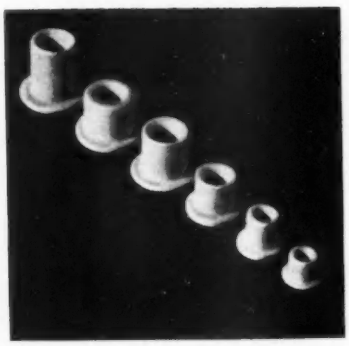
Thread-guide wear in the manufacture of synthetics countered by SINTOX

With the rapid advancement of man-made fibres since the war it became obvious that a far better thread guide material would have to be found, with exceptional qualities of surface smoothness, strength and chemical resistance, and in particular, resistance to abrasion.

SINTOX is an alumina ceramic which has been developed by Lodge Plugs Limited after twenty years' intensive research. SINTOX proved to be ideally suited as a thread guide material, and quickly became established in the modern textile world. Its very great hardness and strength mean that it can be used with



complete success where other materials would wear or break. Its normal velvet finish is so

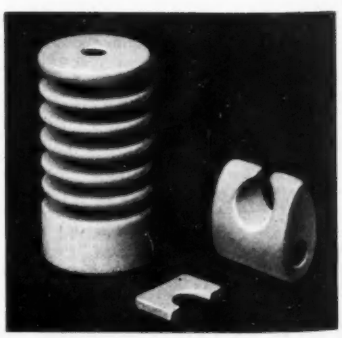


smooth that thread damage is avoided, and the very low co-efficient of friction eliminates tensioning problems.

For several years now SINTOX thread guides have been available to textile manufacturers for use where *very severe* wear problems arise. Unfortunately their expense has precluded more general use in the industry. This has been due to the elaborate and exacting process of manufacture, with high standards of quality control and inspection, coupled with the diversity of thread guide which we have produced.

Now the situation has changed. From the large number of designs produced in the past we have selected a nucleus of "Standard Sintox Guides" which have been in most popular demand, and these are available *from stock* at lower prices. This brings the very real advantage of SINTOX thread guides within the reach of *every* textile manufacturer and extends their use to *all* types of yarn.

Of course, if you have a special problem SINTOX guides can still be made to your requirements at a reasonable price. Our Technical Staff are always ready to give you advice on thread guides without obligation. In any case, why not send for the "Standard Sintox Thread Guide" catalogue which is available on request from Crabtree Textile Accessories Limited, Colne, Lancs.



LANCASHIRE TEXTILE INDUSTRY, 1958. John Worrall Ltd., Odlham (Price 30s.).

The publishers' customary care in compilation and revision have been exercised to make this 73rd edition as reliable and informative as its forerunners. It is a complete guide to the country's yarn and cloth producers and processors arranged both by locality and by classification of goods and services. Lists of managers, secretaries and salesmen are given separately and mill supplies are the subject of a special buying section. The annual holidays of the principal Lancashire towns are shown both alphabetically and in order of date. The Commercial Section gives details of organisations serving the commercial, technical and educational needs of the industry and in the Statistical Section are given many tables indicating the past and present numbers of looms and spindles employed, production figures and price index numbers for textile commodities.

S.P.S.

* * *

REFERENCES TO SCIENTIFIC LITERATURE ON FIRE, PART VIII, 1954. D.S.I.R. and Fire Offices' Joint Fire Research Organisation, Fire Research Station, Boreham Wood, Herts.

1,242 references to published material on fire are contained in this bibliography, which takes account of British and foreign books, periodicals and patents specifications dealing with every aspect of this important subject. The entries are arranged in seven subject classes, viz., occurrence, fire hazards, combustion experimental studies, fire precautions, fire resistance, fire fighting appliances, and general works of reference. Author and subject indexes are provided. Among the entries are many relating to textile, chemical rubber and plastic materials and processes.

* * *

COTTON FABRICS FOR REINFORCEMENT OF RUBBER HOSE. British Standards Institution, 2 Park Street, London, W.1 (price 3s.).

This new British Standard (B.S. 1103: 1957) is the second edition of a specification published in 1943 to deal with the range of fabrics needed for wartime production of rubber/fabric hoses. The requirements of the second edition are confined to fabrics normally called for in hose specifications (some fabrics little used have been omitted). Modified structural particulars have been evolved which will allow increased freedom to the fabric designer and manufacturer without impairing the effectiveness of the specification. Tensile strengths and elongations are laid down; and detailed test procedures for determining them are provided in an Appendix.

* * *

ENTWICKLUNG UND ERPROBUNG EINES VERBESSERTEN ELEKTRISCHEN KETTFADENWAECHTERGESCHIRRS FUER DIE LEINEN-UND HALBLEINENWEBEREI. (Development and testing of an improved electrical warp stop motion for linen and cotton mixture Weaving.) By W. Rohs and H. Griese. Published by Westdeutscher Verlag, Opladen and Koeln. 1957. Pp. 43 (price DM 13).

In this report a comparison is made of the weaving of linen and cotton warps on an improved heald-type warp stop motion and on a mechanical warp stop motion employing conventional droppers. The heald stop motion operates electrically by means of special wire healds which are normally not in contact with insulated bars, but which complete a circuit on the heald shaft when a warp thread breaks. The weaving tests were carried out at high atmospheric relative humidities, so to be able to study relative and breakage rates, stopping rates and repair times. In their report the authors favour the electrical stop motion since, although it takes longer to find the broken end than with the mechanical stop motion, the overall repair time is less. Several modifications to the electrical motion are suggested and detailed. Interesting comments on end breakage rates with and without lease rods are given; lowest end breakage rates occurred when no lease rods were used.

B.S.

* * *

FLAMMABLE LIQUIDS ARE DANGEROUS. Fire Protection Association, 15, Queen Street, London, E.C.4.

Flammable liquids are in constant use and accidents involving them often arise from the casual handling of small quantities of liquid and though they may not lead to large fires they may cause death or serious injury. This recent bulletin describes the most common mistakes made in handling flammable liquids in factories, including the use of unsuitable containers; wearing clothing wet with flammable liquid; throwing flammable liquids on fires, and others. Safety recommendations, including the provision of non-flammable substitutes and installation of appropriate fire-fighting equipment, are given also a short list of general precautions.

* * *

SUPPLEMENTS TO BOOK OF A.S.T.M. STANDARDS.—7 parts; $4.00 per part; $28.00 per set. American Society for Testing Materials, 1916, Race Street, Philadelphia 3, Pa., U.S.A.

The 1957 supplements give in their latest form 415 specifications, tests and definitions which either were issued for the first time in 1957 or revised since the 1955 book or the 1956 supplements.

Part 1. Ferrous Metals (520 pages); Part 2. Non-Ferrous Metals (380 pages); Part 3. Cement, Concrete, Ceramics, Thermal Insulation, Road Materials, Waterproofing, Soils (360 pages); Part 4. Paint, Naval Stores, Wood, Cellulose, Wax Polishes, Sandwich and Building Construction, Fire Tests (218 pages); Part 5. Fuels, Petroleum, Aromatic Hydrocarbons, Engine Antifreezes (340 pages); Part 6. Rubber, Plastics, Electrical Insulation (423 pages); Part 7. Textiles, Soap, Water, Paper, Adhesives, Shipping Containers (280 pages).

* * *

TEST FOR THE DIMENSIONAL STABILITY OF WARP-KNITTED NYLON FABRICS. British Standards Institution, 2 Park Street, London, W.1 (price 3s.).

An important advantage of the warp-knitted nylon fabrics now generally available is that they can retain their original dimensions, without loss of elasticity, throughout use and laundering. This "dimensional stability" is the property assessed by a new method of test (B.S. 2959: 1958), based on Tentative Textile Standard No. 43, published by arrangement between the Textile Institute and the British Standards Institution. The standard specifies requirements for: apparatus, conditioning and testing atmosphere; test specimen; and test procedure.

* * *

FLAX, JUTE AND HEMP WEBBINGS. British Standards Institution, 2 Park Street, London, W.1 (price 4s.).

This new British Standard (B.S. 2958: 1958) was prepared in collaboration with the Joint Equipment Standardization Committee of the Ministry of Defence. The specification proper includes clauses dealing with quality of material, manufacture, methods of test and identification marking. A schedule to the publication allocates a reference number to each of the six qualities of webbings specified; and it gives particulars of widths (ranging from 2 ins. to 3½ ins.) fibre content, weaves, weight of finished webbings and minimum breaking loads.

Trade Catalogues

DEXION SLOTTED ANGLE. A few of the countless uses of this versatile constructional medium are illustrated in the ninth edition of "Dexion Angle," published by Dexion Ltd., Maygrove Road, London, N.W.6. Details of a pavilion to be built almost entirely of slotted angle at the Brussels World Fair are included in this issue.

* * *

AIR CONDITIONING MACHINERY. Musgrave and Co. Ltd., St. Ann's Works, Belfast, have recently produced a profusely illustrated booklet surveying briefly the varied range of their products. Different types of fans, fan bearings, grit and dust collecting machinery; machinery for air conditioning, heating and ventilation, drying, and structural steelwork are all included in this useful brochure.

* * *

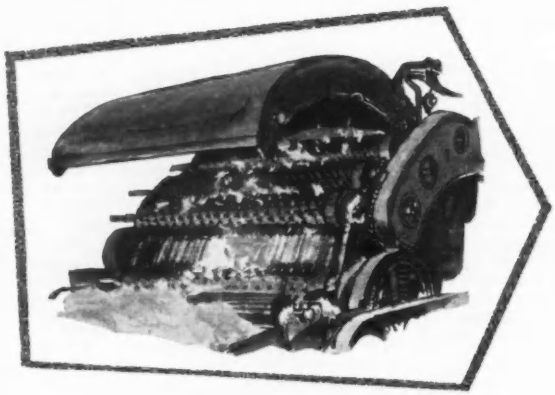
BOILER PLANT ECONOMY. The National Industrial Fuel Efficiency Service, 71 Grosvenor Street, London, W.1, has introduced a new comprehensive annual service aiming at the improvement of boiler efficiency throughout the country and maintenance of that efficiency at the highest possible level. A pamphlet outlining the advantages of this service and showing results of Lancashire boiler plant surveys is now available.

* * *

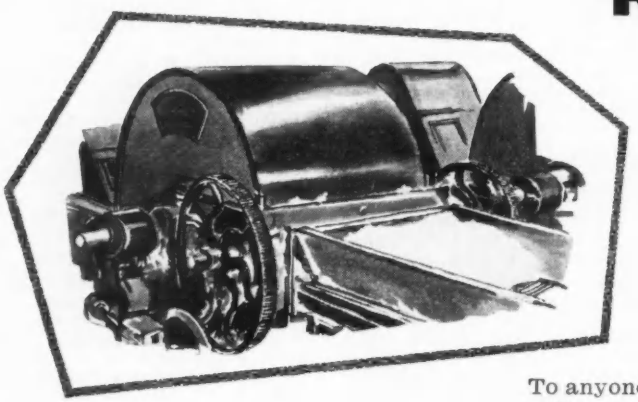
POLYTHENE FILM. A brochure produced by British Cellophane Ltd., 12-13 Conduit Street, London, W.1, describes briefly the properties and types of B.C.L. polythene film and illustrates several of the multiplicity of uses to which this transparent wrapping material can be put.

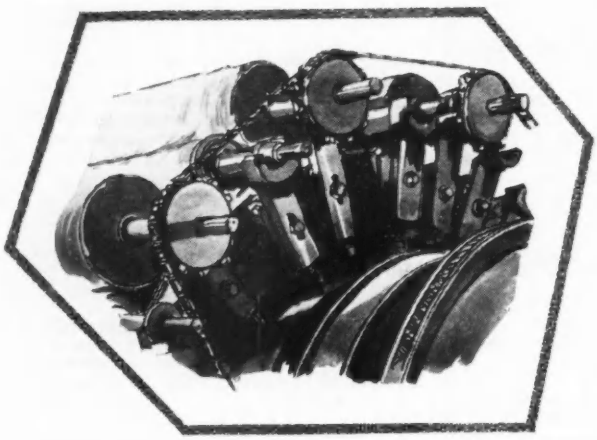
* * *

AERIAL PHOTOGRAPHS. The Aerofilms Organisation, 6 Elstree Way, Boreham Wood, Herts, have published a pictorial booklet reviewing some of the many applications of air photography. One of the chief advantages of an air photograph is the attention value of the unusual viewpoint, and apart from the accepted value for record purposes, air photographs have many other commercial applications, e.g., giant size enlargements as a background for exhibition stand or showroom.



DO YOU RECOGNISE THESE?





To anyone in textiles a rag grinder, a tenterhook willey and a carding engine are so familiar that they are hardly worth a second glance. But they are worth a second thought—for friction and foreign matter in these machines have been the starting point of many a disastrous fire.

Today, however, the fires that they cause in raw materials and fly can be stifled in seconds with a fine cloud of dry powder. Electrical and oil fires can also be killed completely, before they take hold. *Today is the new age of Nu-Swift.*

Every Nu-Swift extinguisher is designed to fulfil a specific function in a complete system of fire protection. There is a Nu-Swift extinguisher for every risk and every extinguisher is operated in the same upright commonsense way. That is why industry and commerce in seventy countries rely on Nu-Swift extinguishers for easy handling and certain operations.

Delay or inefficiency in the operation of your extinguishers could spell disaster. You would be wise to request Nu-Swift to check your present fire fighting equipment. The report will be unbiased . . . won't cost you a penny . . . and could save you a fortune. *Get in touch with Nu-Swift today.*

YOU CAN RELY ON NU-SWIFT

Please let us have full details of the Nu-Swift range of extinguishers and/or arrange inspection of existing fire equipment.

NAME .....

ADDRESS .....

.....

For the attention of Mr. .....

IN THE SOUTH to Nu-Swift Ltd., (Dept S170), 25, Piccadilly, W.1. (REGent 5724)

IN THE NORTH to Nu-Swift Ltd., (Dept N170), Elland, Yorkshire. (Elland 2852)

TMF5

Export Opportunities

U.S.A.:
Sisal Twine

Industry Export Service, 224 East 8th Street, Cincinnati 2, Ohio, wish to import a quantity of sisal twine, one-ply, 360 ft. lengths, packed in 20 lb. tubes, 2 tubes per bale. Purchases will be made in 30,000 lb. lots; i.e. one railway car-load, and possibly three or four loads would be required annually. The company state they prefer to deal with manufacturers direct and informed the British Consulate that a c.i.f. price of 13-14 cents per lb. of twine is what they have in mind. Founded in 1940, they operate on a commission basis as the export/import representatives of a number of manufacturers in the Cincinnati area. Manufacturers interested should write direct marking letters attention of Mr. H. E. Schurgast, president. Quotations should show f.o.b. and c.i.f. Baltimore or New York prices in U.S. dollars.

Italy:
Manila and Wire Ropes

Franco Mercandino, 4/18A., Via San Luca, Genoa, would like to represent U.K. manufacturers of manila and steel wire ropes in Italy. Established in 1954 the firm engage in the import and sales representation of marine technical supplies and chemicals for the treatment of mineral oils, and have a sales organisation covering the whole of Italy. Manufacturers interested should write direct, also notify the British Consulate-General, Commercial Section, Via Gabba 1A, Milan.

Barbados, Leeward and Windward Islands:
Tweed Suitings

S. E. Cole and Co. Ltd., 27 and 28 Roebuck Street, Bridgetown, Barbados, are interested in representing manufacturers of tropical and tweed suitings. Established in 1933 as wholesalers, retailers and commission agents, they cover Barbados, Leeward and Windward Islands. Manufacturers interested should write direct, also notify the U.K. Trade Commissioner, Colonial Building, South Quay (P.O. Box 225), Port of Spain, Trinidad.

France:
Piece Goods, etc.

M. Georges Francke, 5 rue d'Artois, Paris, 8, would like to represent U.K. manufacturers of men's suitings, fabrics for women's outerclothing and suede coats and jackets. M. Francke is able to speak and write in English and is prepared to visit the U.K. to investigate any serious propositions made. He represents French manufacturers of men's and children's clothing and also a U.K. manufacturer of raincoats. Manufacturers interested should write direct, also notify the British Embassy, Commercial Department, 35 Rue de Faubourg St. Honore, Paris, 8e.

U.S.A.:
Luggage

The Simon Hardware Company, 800-824 Broadway, Oakland 7, California, wish to import men's and women's luggage from the U.K. They are interested in canvas travel bags with leather or plastics trimmings, imitation leather bags and travel cases, etc. Established in 1899, they are importers/retailers of hardware, sporting goods, household appliances, etc., in the San Francisco Bay area. Manufacturers interested should write direct with quotations showing both f.o.b. and c.i.f. prices in U.S. currency, also copy correspondence to the British Consulate-General, 2516 Pacific Avenue, San Francisco.

Western Germany:
Woollen and Carpet Yarn

Herr Erich Leskien, Berlin-Lichtenrade, Saalower Strasse 8, would like to contact a U.K. firm of woollen and carpet yarn manufacturers, prepared to grant him the agency for West Berlin and the Federal Republic. Manufacturers interested should write direct to Herr Leskien and to the British Consulate-General, Charlottenburg 2, Uhlandstrasse 7-8, Berlin.

Pakistan:
Textile Machinery, etc.

Mohd. Ismails, Edwardes Road, Rawalpindi, have been promised sanction and an import licence for setting up a mill at Rawalpindi. Quotations are required for:—

(1) Worsted spinning plant of 2,000 spindles (new or secondhand).
(2) Thirty looms for weaving tweeds, worsteds, etc.
(3) All auxiliary machinery including a boiler.

Proformas are required in triplicate and should be forwarded to Mr. Mohd Ibrahim at the above address. Mr. Ibrahim also owns Beaufort Readymade Garment Factory at Rawalpindi and requires quotations for:—

(1) Fusing solvent for trubenising.
(2) Acetate mixture interlining.

Mohd. Ismails are an old-established partnership concern of tailors, drapers and direct importers, and manufacturers interested should write direct, also notify the U.K. Trade Commissioner, National House, Bank Square, P.O. Box No. 287, The Mall, Lahore.

South Africa:
Suitings, Knitwear, etc.

Beit Textiles (Pty) Ltd., Plowright Building (2nd Floor), Cnr. of Plowright Lane and Pine Street, Durban, are interested in securing representing U.K. manufacturers of lightweight (10–12 ozs.) worsted suitings; knitwear all lines; sheetings 63, 80 and 90 ins. Formed in 1953, they represent U.K., U.S. and Continental textile manufacturers and sell to wholesalers and manufacturers. Manufacturers interested should write direct, also notify the U.K. Trade Commissioner, 410 United Buildings, Smith Street, Durban.

U.S.A.:
Supplier for Hotels, etc.

M. Tony Sherman and Associates, 1101 N.E. 79th Street, Miami, 38, Florida, a firm of architects, are now engaged in drawing plans for hotels in Jamaica, South America and also for a project in the U.K. and would be interested in receiving literature and any other information describing and quoting on U.K. merchandise which might be used in such establishments. Suppliers interested should write direct and quotations should show f.o.b. and c.i.f. prices in U.S. dollars, also copy correspondence to the British Consulate, 723 Ingraham Building, S.E. Second Avenue, Miami, Florida.

Canada:
Mattress Ticking

Mr. E. E. Knight, 168a Duckworth Street, St. Johns, is interested in obtaining a U.K. source of black and white striped ticking. Mr. Knight wishes to obtain this on behalf of the Newfoundland School for the Blind, who normally purchase in quantities of 10,000 yds. of plain ticking at a time and also use small quantities of fancy ticking. Mr. Knight, a manufacturers' agent, handles a number of U.K. lines, and suppliers interested should write direct, also notify the U.K. Trade Commissioner, 65 Spring Garden Road, Halifax, Nova Scotia.

Netherlands:
Half-Linen Table Cloth

The firm of J. Y. de Korte, Oranjelaan 164, Dordrecht, would like quotations from U.K. suppliers for half-linen table cloth with printed or woven (fancy) patterns. Established in 1956 as importers, exporters and wholesalers they deal in all kinds of needlework, embroidery, baby wear and similar fancy articles with better class shops. Suppliers interested should write direct, also notify the British Embassy, Commercial Department, Lange Voorhout, 32 the Hague.

Western Germany:
Cotton Piece Goods

Heba-Wascheverleih, Berlin-Zehlendorf, Busse Allee 22, would like offers from U.K. cotton weavers able to supply medium to good quality materials suitable for sheets, table cloths and, particularly, towels with the firm's name woven in; annual requirements would be around 8-10,000 towels. Heba-Wascheverleih are engaged in supplying hotels, restaurants and the catering trade in general with towels, table cloths, etc. Manufacturers interested should write direct also notify the British Consulate -General,Charlottenburg 2, Uhlandstrasse 7-8, Berlin.

Western Germany:
Tartan Materials

A. Sternjakob, K.G., Frankenthal/Pfalz, Am Strandbad, want to contact U.K. manufacturers of Scottish tartan materials for use in the manufacture of handbags, travelling bags, etc. Established in 1932, they are leather goods manufacturers and employ 220. Manufacturers interested should write direct, also notify the British Consulate-General, 47, Zeppelin Allee, Frankfurt/Main.

Wood engraving by John Farleigh

Running to save m'lady

RUNNING FOOTMEN were accustomed to running in front of their masters' carriages, clearing the way ahead, but sometimes they had more exciting tasks to perform. During the reign of the first Elizabeth, Lord Berkeley's wife fell ill and Langham, running footman to his Lordship, "carried a letter from Callowden to old Dr. Fryer, a physician dwelling in London, and returned with a glass bottle in his hand, compounded by the doctor, for the recovery of her health, a journey of 148 miles performed by him in less than forty-two hours, notwithstanding his stay of one night at the physician's house; which no one horse could have so well and safely performed; for which the Lady shall after give him a new suit of clothes."

Today, merchandise travels faster than in Langham's time but rarely does one man guard it to journey's end. Manufacturers look after their goods by packing them snugly and safely in cartons made from 'Thames Board', and in 'Fiberite' cases made from solid or corrugated fibreboard.

THAMES BOARD MILLS LIMITED

Purfleet Essex and Warrington Lancs

THE LARGEST MANUFACTURERS OF BOARD AND PACKING CASES IN GREAT BRITAIN

TB 54-5056

Textile Trade and Prospects

No Easing of Cotton Cloth Imports

Little, if any, improvement is apparent in the spinning and weaving sections and short-time working continues to increase slowly in both sections; production of yarn and cloth must be considerably below the level of a year ago. Changes in yarn and cloth quotations have not had much effect in stimulating inquiry and the present situation regarding American cotton does not inspire the slightest degree of confidence. Yarn inquiries have been fair but no great volume of business materialises from the many negotiations. Definite orders are confined to small lots covering a very wide range of counts and qualities but the demand, in general, is most unsatisfactory and mills cannot afford to take any further risks in running to stock in view of the capital involved. Most of the business finalised has been in standard weaving qualities in the medium count range in single and doubled yarns. The call for hosiery qualities is poor and for the finer combed yarns worse still; little interest is being shown in the Bolton-type specialities, although a little more interest has been coming from one or two export outlets. Moderate weights of coarse and condenser yarns continue to move along but, compared with the production possibilities, the amounts are little or more than a trickle.

The month has also been exceptionally quiet in cloth markets. Imports of cotton cloth continued to arrive on a heavy scale from India and Hong Kong and with almost disastrous effects on many Lancashire manufacturers. As yet no announcement has been made concerning the progress—or otherwise—of the discussions between Sir Frank Lee, Permanent Secretary of the Board of Trade, and leaders of the Hong Kong textile industry.

Actual cloth sales have been poor on the whole. Few buyers show any signs of wanting to operate in anything resembling substantial yardages. A little interest has been displayed in a few specialities. Fine cloths are very badly supported and those woven from medium and coarse yarns fare little better. Small orders for dress, etc., fabrics and shirtings in the medium price brackets have gone through for home market requirements. Interest is something like equally divided between novel dobby and jacquard designs, and machine and screen printed styles. In furnishing fabrics the interest seems to have been slightly better. Traditional and contemporary designs in attractive colour combinations compete for what support is available. Smart duplex printed cloths in beautiful effects and perfect register are finding increasing favour amongst some buyers. The bulk of available orders, of course, have been for home trade account but even early deliveries do not stimulate sales. In household textiles the general position is slightly better with bright, colourful designs in hand and bath towels finding steady outlets in face of intense competition. Pastel shades and check effects in cotton blankets have found reasonable support. Export business is still pathetic. A few lines have gone to Commonwealth countries and small amounts to continental outlets.

Wool Production

U.K. sheep farmers produced more wool in 1957 than in any year since 1939. The clip totals over 75 million lbs.—7¼ million lbs. more than that for 1956. Announcing the record in a letter to sheep farmers, the chairman of the British Wool Marketing Board, Mr. H. C. Falconer, states: "Not only has more wool been produced, but it has also been presented in better condition, and the proportion of wools of above average value has increased. Because of these last two factors the Board has paid to producers about ¾d. per lb. more than the figure used as the basis for the 1957 price schedule. While wool production during the past year has been most encouraging, market prices have declined. The fall in wool values in world markets between October, 1957, and January, 1958, has inevitably affected prices realised by British wool, although not to the same extent as merino wool prices. At the time of writing the wool trade is still rather unsettled, but the relationship of world supply and consumption is still healthy provided that the solution of international difficulties restores confidence in the trade.

The British Wool Marketing Board also announce arrangements for the 1958 clip, including the schedule of maximum prices for over 300 grades of British wool. These prices are based on the average price guaranteed by the government for wool of the 1958 clip, but the individual grade prices reflect the relative market demand for various wools during 1957. The new price schedule is designed to pay an average price of 50·85d. per lb. to wool producers. This is 0·5 per lb. less than the target of last year's schedule, although the overall wool guarantee remains the same at 56·25d. per lb. The difference is mostly due to the increase in interest rates since April, 1957, when last year's marketing cost budget was prepared. The Board state that one feature of the wool market in 1957 was the relatively better demand for the finer wools of the British clip. Coarse mountain wools such as Blackface and Swaledale did not fare so well because of reduced buying by the carpet and tweed trades. Demand from the worsted trade was more active than that from the woollen trade and this tended to favour finer wools. As the 1957 clip contained a greater proportion of valuable wools than in the previous years producers have been paid about 0·7d. per lb. more than the target figure of 51·35d. per lb. The overpayment—approximately £220,000—will be met in part from a special fund set aside for this purpose. The excess will be carried forward and met from any future underpayment. The Board also announce that, after careful consideration, they have decided that the premium of 3d. per lb. is to be paid on wool from sheep of hill breeds in the 1958 clip. This premium is taken into account in the new price schedule.

Aggregate world wool production in 1957-58 is estimated by the Commonwealth Economic Committee at 5,020 million lbs. (greasy), or about 1% less than the revised total of 5,070 million lbs. for the previous season. On a clean basis, this is equivalent to some 2,905 million lbs., also 1% below the 1956-57 estimate, and the reduction is the first to have occurred in world production (clean basis) since the war. It is estimated to have affected only merino wool, as the output of crossbred and other wool is a shade higher than in the previous season. Raw wool production in the free world in 1957-58 is estimated by the Committee at 4,160 million lbs. (greasy) or 2% less than the revised 1956-57 total of 4,235 million lbs. The reduction, compared with an earlier estimate for 1957-58, is due chiefly to a downward revision of the Australian clip and, to a lesser extent, of the United States clip. Output in New Zealand, the U.K., Argentina and Uruguay, is estimated to be larger in each case than in 1956-57 but the final figure for the South African clip is expected to show a small reduction.

Linen Trade Review

The trade recession now evident in some important overseas markets has added to the difficulties at present experienced in meeting the competition of rival textiles at home and abroad. There is a lot of wishful thinking that conditions giving rise to the present set back in demand will pass, but little serious consideration is given to the factors responsible for the present economic position of the industry, and whether, or how, they can be countered successfully.

A lengthy period in meeting the easy requirements of a starved consumer market, followed in turn by an era of prosperity in which price was a secondary consideration to consumer interest has now given way to a consumer market flooded with competitive textiles which are keenly priced, possess the merits of appeal and usefulness and, in some instances at least, have decided advantages from the standpoints of serviceability and launderability. The industry is now faced with the clear cut problem of meeting the challenge by improved manufacturing methods which permit also a substantial reduction in selling price of linen goods or, alternatively, adapting its plant and manufacturing techniques to processing man made fibres which are its chief competitors. Failure to do one or other must result in a further substantial reduction of productive capacity.

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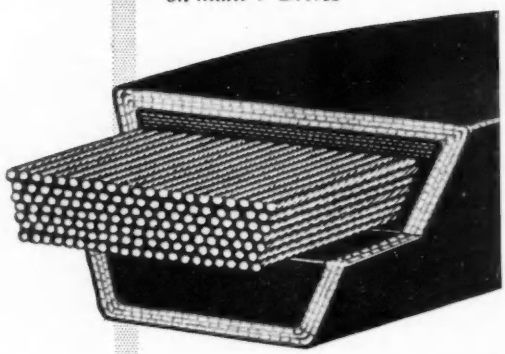

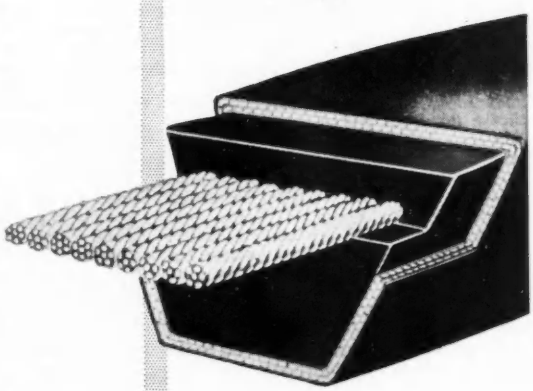

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The uncertain raw material position, consequent on the industry's almost complete dependence on foreign sources for its flax requirements, and technical problems incidental to manufacture, hold little prospect of an appreciable reduction in the selling price of linen goods. The alternative then lies in extending the manufacture of man made fibre products and calls for a considerable increase in the count and quality range of yarns spun on the flax system. The erection of large scale plants by Courtaulds, Chemstrand, and I.C.I. in N. Ireland for the production of man made fibres ensures the industry's raw material requirements, and provides a pointer for development in this direction.

Contrary to opinion in some quarters such a step would not necessarily hasten or presage the eclipse of flax spinning and linen manufacture. For certain household and personal uses linen still has first preference in the mind of the consumer however appropriate its competitors may be. In these spheres where it is firmly entrenched there is considerable scope for expansion, and in many others where it has been steadily losing ground during the last decade a careful study of market trends, together with a more imaginative approach to the problem of stimulating consumer interest would undoubtedly effect a worth while expansion in demand.

The problem of flax supplies looms larger each year. Apathy on the part of the spinner, together with lack of Government support, have been effective in eliminating home flax production. Resumption of exports in considerable bulk from the U.S.S.R., while filling the gap, caused by shortage of domestic supplies, was also responsible for maintaining raw material values in West European markets at uneconomic levels. In their efforts to maintain production on a profitable basis flax growers are concentrating on high yielding strains with emphasis on bulk rather than on quality, with the consequence that spinners and manufacturers are finding increasing difficulty in maintaining quality standards, and are hard put to obtain sufficient high grade material to meet the growing interest in quality and speciality products, which constitute the most profitable part of their turnover.

The decision of the Belgian Ministry of Agriculture to grant a subsidy of 2,000 francs per hectare for flax growing has been welcomed by all sections of the industry. Although the announcement was protracted it has stimulated demand for sowing seed. Current transactions in the fibre markets are limited to odd lots for immediate cover. Interest is centred on the medium and better grades, with prices firm. Supplies from scutch mills are declining as labour is being diverted to retting.

Man-Made Fibres and Fabrics

Activity among yarn producers is fairly well maintained, although the off-take is not as good as hoped for at this time of the year in both home and export. Yarn deliveries are good but might be better with some bulked yarns. The popularity of cotton/"Terylene" blends in Lancashire trade, and cotton/nylon blends for the Midlands continues and more could be readily absorbed if it was more freely available. Deliveries of a few types of woven cloth are reported to be lengthening slightly but little delay is experienced on the whole. On the heavier side Lancashire is producing some interesting deck chair fabrics consisting of 100% "Terylene." In pleasant printed designs, these are very pleasing to the eye and exceptionally hard-wearing.

Demand is steadily increasing for the new "silk" type of "Terylene" fabrics which are available in a variety of types from dress fabrics to furnishings. There is also plenty of development work proceeding in connection with discharge printing of "Terylene." There has been a slight easing off in the Yorkshire trade on the worsted side but activity in the woollen sections is still very good and many extremely attractive blended cloths are now on the market.

Business in Leek and Macclesfield trades is inclined to be patchy still, with orders in the main only of small volume. Ribbons, petershams, gimps, are all in request to varying degrees, but the smallwares' trade on the whole is slack. Macclesfield trade reports is reasonably active on the weaving side but printing is generally quiet with the exception of hand-block work for which there continues to be a good export demand. Screen and roller printers would certainly welcome more work.

Some interesting results are reported by knitters in the Leek and Midland areas with bulked "Terylene" yarns. Warp-knitters are fairly active particularly with lingerie fabrics but making-up sections are not very satisfied with the present position. An example of new developments taking place in the knitwear field is the production of knitted blankets, made from 100% "Terylene" which should be assured of a good future. Attractive to the eye and very pleasant to handle the blankets in question are reported to be circular knitted. On the whole, trade is nothing like as good as it might be. Lack of confidence seems to permeate the whole industry. The volume of business is confined to small orders with neither buyers or sellers eager to commit themselves to carrying large stocks of yarns or finished goods. In fact, this very attitude goes through all the way to the retail trade.

Jute Fibre, Yarn and Fabrics

Raw jute markets have remained firm during the past month but how much of this firmness and scarcity of offers was due to artificial factors is difficult to say. Pakistan authorities have done their utmost to maintain prices at a high level and in this they have been successful. All offers of raw jute have now to come direct from Pakistan and trading through India is not allowed. It has caused inconvenience in that the cable service between East Pakistan and the U.K. can suffer from considerable delay, and this delay at the Pakistan end makes it difficult for sellers to transact business on a fluctuating market when up-to-date news is not available.

Everything points to Pakistan being able to maintain prices for the remainder of the 1957–58 crop. Offers of fibre are not freely made as the bulk of the crop yet to be marketed appears to be strongly held. It is obvious that Pakistan is not able to take a long view of the position because of her need to obtain as much foreign exchange as possible. This may have disastrous effects on her economy in years to come because the high price asked is forcing consumers of jute cloth to look for substitute materials. From her own immediate point of view she is following the course most countries would take. She realises that so far as the present crop is concerned if prices were reduced no more raw jute would be sold but her intake of foreign currency would be reduced.

There is a general hope that when offers of the next crop are made that prices will show a fair reduction from the present level. It is too early to speculate on this, but it must be remembered that sales are not allowed to be made for more than three months ahead. This could have the effect of keeping prices firmer than is normally the case. Offers of Mill Firsts are scarce with prices ranging from £114 to £117. Mill Lightnings are available at £99 and Mill Hearts at £88, but most shippers are asking more. Spinners here are not always being attracted by low prices and they prefer to pay a premium to obtain a selected mark. Up to £2 per ton more than the above rates have already been paid. Offers of grade Hearts are being quite freely made with prices ranging from £72 15s., but this low quality of raw material is not attractive to U.K. spinners and it is only used in small quantities. Offers of dark jute are scarce with grade Tossa-2/3 generally quoted at £111 and grade Tossa-4 at £103. Outport Tossa-2/3 is at £97 and Outport Tossa-4 at £83. There is a wide range of crack Daisee-2/3 prices ranging from £101 to £104 with grade Daisee-2/3 available at £94, c.i.f. U.K., April/May shipment. U.K. spinners have shown some interest during the past few weeks, and the business passing has been about equal to their cut-up. This type of buying may very well continue until supplies of the next crop become available.

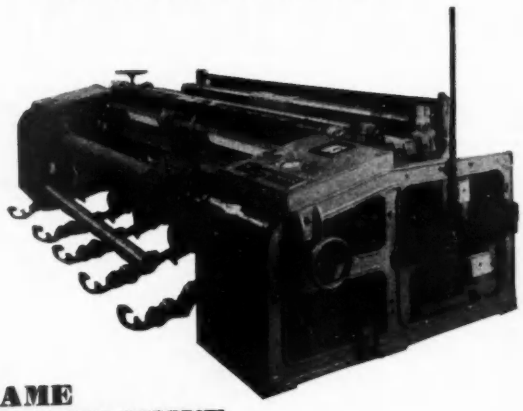
Since minimum prices were fixed for sales of Calcutta goods by I.J.M.A., the market has remained more or less steady. Buyers in the U.K. have shown interest and a fairly steady movement has taken place. Quotations are at 60s. 2d. for 10 oz. 40 ins., and at 45s. 5d. for 7¼ oz. with 11 oz. 45 ins. at 66s. 8d. per 100 yds. f.o.b. Calcutta for April shipment. B twills were quoted at 151/3 April.

Since the mark-up in price of imported Asiatic jute goods was reduced to 30% last year, the position in Dundee has become quieter. Spinners and manufacturers are finding orders difficult to obtain and short time working is now in force. However, this drop in demand for Dundee made goods is not entirely due to the government decision to reduce protection to the home industry; world recession in trade is the main factor. The position in America is badly felt by certain manufacturers here producing very wide cloths for the tufted carpet trade. At present, demand from America for this type of cloth has fallen away and it was announced by Jute Industries Ltd. only last month that owing to a progressive fall in the prices obtained for white jute fabric in the U.S.A., it has been necessary to concentrate the manufacturing activities of the company in order to meet this highly competitive situation by lowering costs. Consumers of both jute yarns and cloth are restricting their purchases to small quantities for quick delivery with the result that producers cannot see any distance ahead. However, the carpet trade is still taking regular deliveries of yarns and this is helping certain spinners to maintain output.

BOUCHER MACHINERY for the CARPET INDUSTRY

HYDRAULIC BEAMER

Lockheed Hydraulics enable constant pressure to be applied to beam rollers, from nothing to 1,000 lbs. per square inch, each side controlled independently. Constant Peripheral Beaming Speed throughout entire range of beam, from 6" diam. barrel to 36" diam. flange, at three different speeds. Totally enclosed oil immersed Constant Speed H-Gear Unit. Warp Length guaranteed. Machine automatically cuts out at any pre-set yardage for any number of beams, until re-set.



Tube frame threaded with the spool in its spring holders; eliminates four operations (patents pending). Needles are brought forward by simple foot operated switch, leaving operatives' hands free to attend to interrupted ends and return to thread by the same operation. Tube frames can be threaded as fast as removed from the chain, thus facilitating immediate return to their last position in the chain. All needles have rounded crochet hook ends, preventing yarn damage and enabling smoother threading. All spool end strive difficulties overcome enabling, 100% threading even if strive is as much as 1" by our new full length comb. By fitting side supports the standard 4/4 machine can thread 2/4 to 16/4 Tube frames, or a machine can be supplied 12/4 in width. Tube Frame automatically clamped eliminating still a further hand operation.

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"CONSOLE" HIGH SPEED CARD CUTTER

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Notes and News

Productivity Films

The British Productivity Council has found the film one of the best mediums for "putting across" both the need for raising productivity and practical appreciation of new techniques and methods for increasing output. B.P.C. films have dealt effectively with emotional subjects like "restrictive practices" and "resistance to change" and technical subjects like work measurement and production control. An important factor in their success has been that in dealing with controversial subjects, or techniques in which some conflict of interest may be involved, these films represent the joint views of employers and trade unionists. The films explore and depict the ground common to both "sides" of industry, and have done a great deal to show how extensive the area of agreement is on matters affecting efficiency and high output. The B.P.C. has now produced a catalogue of the films with descriptive notes and copies can be brought from the B.P.C., 21 Tothill Street, London, S.W.1, or hired from the Central Film Library, Government Building, Bromyard Avenue, Acton, London, W.3.

British Textiles and E.F.T.

Speaking at the recent annual dinner of the Textile Department of Leeds University, Sir Ernest Goodale (president, Textile Institute) suggested that the various sections of the textile industry should unite to study the implications of European Free Trade projects. The textile industry should regard itself in one grand conception and not as a collection of industries engaged in different branches of textiles, he said. The wool, cotton and other sections of the U.K. textile industry last year exported products to the total value of £346 millions which, with £43 millions earned from exports of textile machinery, accounted for one-eighth of all U.K. exports, apart from the export of clothing. It was served by ten research associations which, in some spheres, kept the industry in front of those of other countries. Mr. A. D. Blackburn, president of the British Wool Federation, emphasised that European Free Trade must also be fair trade. If some countries did not remove artificial support of their export trade, it would be impossible for others to compete on equitable terms.

European Common Market

Recently published books, pamphlets and other literature relating to the European Common Market are shown in List No. 4 in the European Economic Co-operation series of leaflets issued by the Commercial Library, Central Library, Manchester 2. All the material listed can be consulted at the Library. In addition to literature dealing directly with E.C.M. prospects and problems the pamphlet includes useful sections on statistical and other sources of material, also a list of press and advertising directories covering principal European countries. Copies can be obtained free from the commercial librarian.

City and Guilds Insignia Award

The council and executive committee of the City and Guilds of London Institute have conferred this year's special insignia award in technology (textile industries—woollen and worsted weaving and dyeing) on Mr. D. R. H. Williams, C.B.E., managing director of John Taylor's Ltd., Colne Road Mills, Huddersfield. These awards are conferred upon people of outstanding ability, who have through further study and responsible experience broadened their knowledge of the problems of their industry and have extended their understanding of the scientific principles upon which it is based.

The citation states that Mr. Williams, during his apprenticeship, took as an evening student from the age of 19 a series of City and Guilds certificates in woollen and worsted weaving and wool dyeing and was awarded first prize and silver medal in the former subject in 1901. For a long time, he was chairman of the Institute's Advisory Committee for woollen manufacture, and has contributed a vast amount of work for the woollen industry for which he has gained a high reputation. He is the author of books on various aspects of management organisation and costing in wool textiles, an inventor of textile machinery, and was one of the founders of the Wool Industries Research Association, the continued progress of which owes much to his energy and drive.

A Fellow of the Textile Institute and a member of the Institute of Fuel, Mr. Williams is well known to textile technologists all over the world for the innumerable stimulating articles contributed by him to *Textile Manufacturer* over a long period of years.

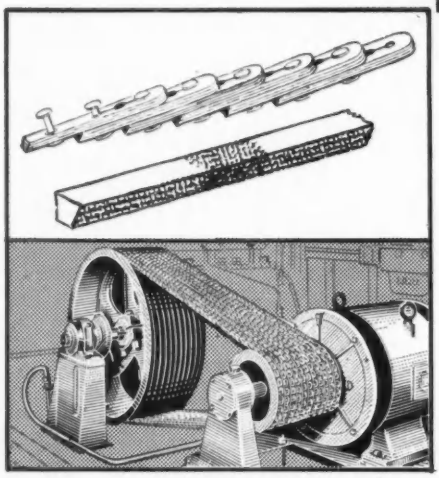
New Roller Covering Service

A small factory has been opened in Dundee by the Armstrong Cork Co. for servicing and fitting roller covers for the textile trades. The range includes covers made of synthetic rubber, combinations of synthetic and cork and also plain cork. The firm has taken over a disused section of Wellfield Works, Kemback Street, Dundee, which will be known as Accotex Works. The premises are designed to give a speedy supply, fitting and maintenance service to Scottish mills. Dundee was chosen as the appropriate site, being the centre of the jute and flax industries.

Armstrong Cork Co. is an American concern but already has three large factories in England, the products of which include floor coverings, acoustic tiles, fittings for furniture feet, etc. The opening ceremony took place on March 26, and was attended by over 100 guests. A display of the various products of the firm was on show. A textile division has studied the many needs of the textile industries and it is claimed that they can provide a roller covering for every type of frame and fibre. The factory in Dundee will be under the control of Mr. C. Fraser, who is engineer in charge of Armstrong's Scottish textile division.

l. to r.—Mr. C. Fraser (Armstrong Cork Co. Ltd.), Mr. Johnson (Engineer to Baxter Bros. of the Lowe and Bonnar Group), Mr. Todd and Mr. Russell (Mill Managers) seen examining the assembly of a flax spinning roller

the end to endless trouble



Brammer V-Link Belting is built up of detachable and inter-changeable links, to form a belt of any required length.

This unique construction eliminates fatigue, the chief cause of failure of solid Vee Belts.

Ease of joining up eliminates costly dismantling of machinery, bearings, shafting, etc., when fitted.

Brammer V-Link Belting in action is a demonstration of Vee Belt efficiency.

For economy, fit Brammer Vee Link Belting for all your Vee Belt Drives.

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LACON light alloy handling containers

ESPECIALLY DESIGNED FOR THE TEXTILE INDUSTRY

Light in weight, easy to keep clean, save labour and space

These new light alloy containers for the textile industry make all other types of materials handling equipment out of date. They are easier to handle and easy to keep clean. No "mark off" like ordinary aluminium containers, no soft surface to scratch.

The perforated models give ventilation during storage and allow steam treatment and drainage in the one container. Made of heat treated and tempered aluminium alloy they are light in weight, infinitely durable and non-corrodible. And because they are fabricated, not one piece units, they are low in cost and can be economically repaired.

Send for descriptive data sheets of models that interest you.

HANBOX K.200
with or without perforations

For loom "doffings" the Hanbox can be fitted with wall brackets to clamp on machine side. In natural alloy or anodised finish. Standard sizes, 28″×19¾″×16″ high (wt. 11 lbs.) and 22½″×15¼″×12½″ (7½ lbs.). Special sizes to order.

This model of the Latrol is ventilated for storage and provides for steam treatment and drainage, whilst the material is in transit from machine to storage.

LATROL W.100

A versatile design of handling container, now being widely used by textile manufacturers. Available in natural alloy or anodised finish, with or without ventilation perforations. Various wheel arrangements and sizes available. Inner dimensions 40¾″×25½″×29¼″ high, weight capacities up to 880 lbs.

Light Alloy Construction Limited, Mowden Hall, Darlington, Co. Durham. Telephone: Darlington 5226

London Office: 5a Dean's Yard. S.W.1 Telephone: Abbey 1365

Service for Exhibitors

The popularity of exhibitions for the purposes of both consumer and industrial sales promotion is constantly increasing and Ripley, Preston and Co. Ltd. have prepared a 12-page, full-coloured booklet outlining the comprehensive service which they can provide for the exhibitor. It describes how they channel the arrangement of all the necessary requirements—stand design and construction, cleaners, demonstrators, press and public relations, etc.—through their own organisation. An interesting part of the service is the construction of a three-dimensional model of any proposed stand, which ensures a proper and practical assessment of the display. The company have six, self-contained provincial offices and copies of the booklet are free on request from the head office at Ludgate House, Fleet Street, London, E.C.4.

New Israel Textile Project

From its office in Jerusalem, Barclays Bank D.C.O. reports that the Israel Minister for Trade and Industry has reached agreement with representatives of a group of foreign Jewish investors on the construction of a spinning mill of 15,000 spindles in Ofakim, one of the country's new towns in the south. An adjoining weaving shed with 120 looms is also planned and a finishing plant will be set up at a later date. The enterprise, says the Bank, will represent an investment of five and a half million Israeli pounds.

"Shirley" Pressure Point System

Shirley Developments Ltd., 40 King Street West, Manchester 3, state that James Haworth and Co. Ltd., Victoria Works, Farnworth, near Bolton, and Textile Air Systems Ltd., Unsworth Street, Radcliffe, near Manchester, have been licensed to manufacture and instal the "Shirely" pressure point system for card dust extraction. Two other firms—Hamilton (Rochdale) Ltd., Cheetham Street, Rochdale, and Mellor Bromley (Air Conditioning) Ltd., Barkley Road, Leicester—had already been approved.

Cotton Board Appointments

Mr. W. Crossley and Mr. J. M. H. Grey have been appointed to the Cotton Board to represent the interests of carrying on the business of finishing and of weaving concerns. Mr. Crossley, who succeeds Mr. H. Haygarth Jackson, is managing director of Yorkshire Dyeing and Proofing Co. Ltd., Middleton, and Mr. Grey, who succeeds Mr. E. Noble, is managing director of John Grey Ltd., Burnley.

Fire Protection

Plastered walls and ceilings are being increasingly replaced by boards, many of which are combustible. This may result in a reduction in the standard of safety, unless the degree of fire protection or fire risk introduced by the different types of board is borne in mind. F.P.A. technical information sheet 4005 "Partitions and Internal Linings" is a review, from the fire protection point of view, of building boards and methods of installing them.

Roof Construction.—A roof may spread fire in four ways; by transmitting fire laterally and by dropping burning particles below; by radiating heat from the underside; by allowing fire to penetrate from below and set fire to the outer surface; by giving off flying brands on to neighbouring buildings. Technical information sheet 4006 "Roof Construction" discusses types of roof construction and properties in relation to some of the elements of roof construction. Copies of both sheets can be obtained free on application to the Fire Protection Association, 15 Queen Street, London, E.C.4.

Applying Coloured Designs to Synthetics

Ingenious methods of applying coloured designs to nylon or "Terylene" fabrics have been discovered in the research laboratories of Bradford Dyers' Association. The basis of these new methods of fabric decoration is to bring about disorientation of the molecules of the fibres in the area of the design thus allowing dyes to penetrate more easily. With nylon fabric this is first resist treated and then passed under heat between rollers one of which carries an engraved design. Where heat and pressure are applied the molecules in the fibres are disoriented. The fabric is then piece dyed, the dye penetrating only the area of the design where disorientation has occurred. This enables striking coloured designs on white grounds to be obtained. Although technically more than one coloured design can be applied by running the cloth through separately for each design, in practice the process is generally restricted to one colour in the design. On "Terylene" the process differs somewhat but is fundamentally related to that used on nylon fabrics. The most attractive results produced so far are delicate two-tone effects with a character of their own. These new processes christened "Illuminated Emboss," have been patented by the B.D.A.

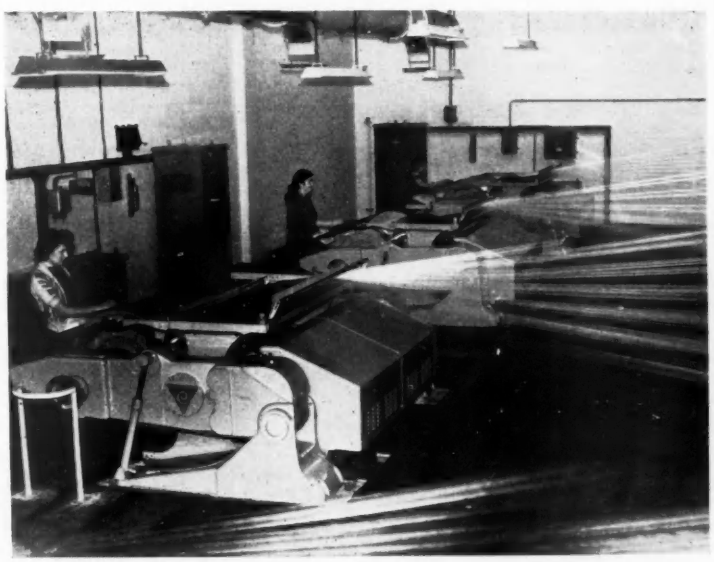
U.S. Quota Hits Scots Tweed Exports

Exports of Scottish tweed during 1957 fell by just over 8% from the previous year's total of 8,349,000 sq. yds. said Mr. J. R. Scott-Noble, president, at the annual meeting of the National Association of Scottish Woollen Manufacturers in Edinburgh. Their value was £9,000,000—£750,000 below the 1956 figure. Sales to North America—the industry's biggest overseas market—dropped by more than one-quarter, but higher exports to other parts of the world, notably western Europe, cushioned the fall. Home market consumption was only 2% lower than the 1956 figure. Total production by the industry was 22,950,000 sq. yds. compared with 24,124,000 sq. yds. during the previous year.

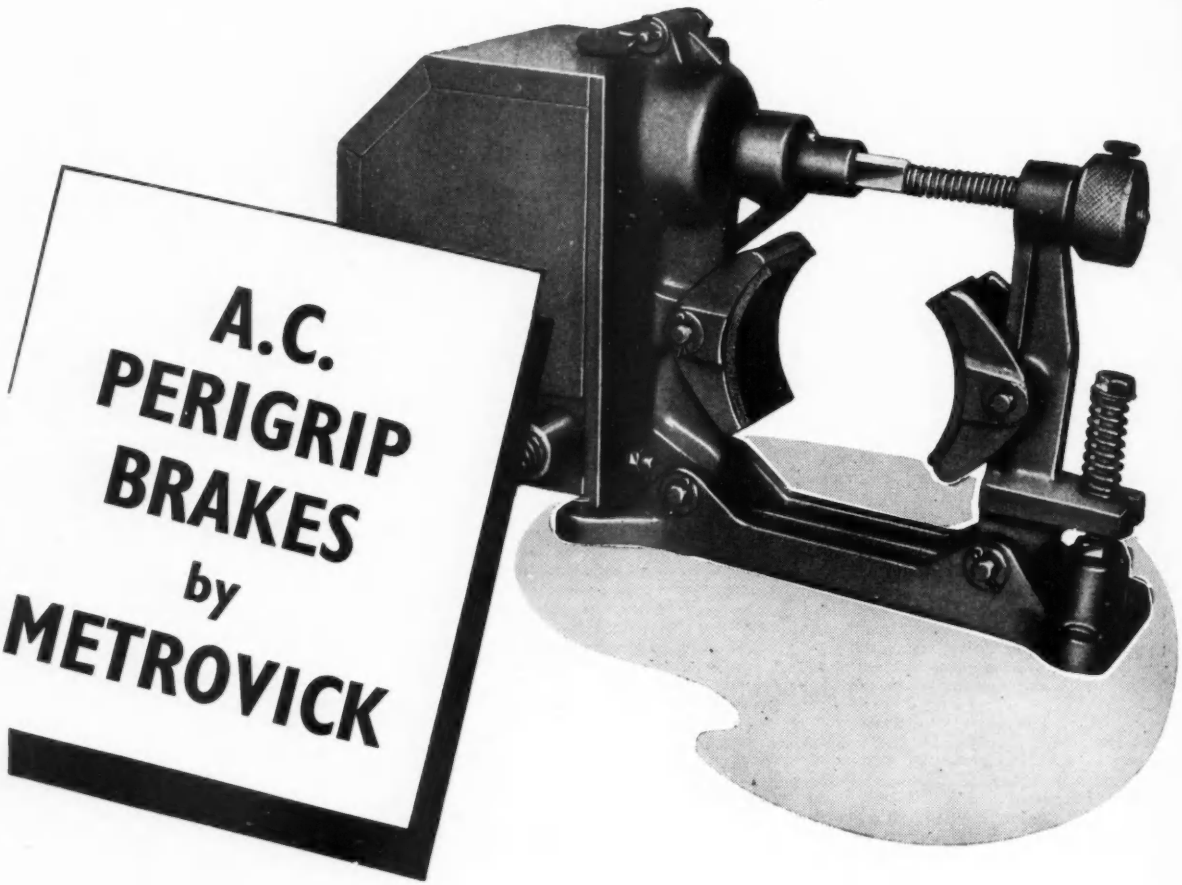
The greatest part of the drop in American demand, continued Mr. Scott-Noble, was caused by the tariff quota imposed by the U.S. government. Last year the quota was filled by the end of July; between then and the end of the year, deliveries were 52% lower than in the similar period of 1956. Dollar earnings (including those from Canada where the recession also affected results) were about $13,650,000 compared with $18,000,000 in 1956. In overseas markets other than North America, sales rose by 16% and particularly good results were obtained in Belgium, Italy, Sweden and Japan. Exports to the British West Indies and Bermuda jumped to nearly three times their 1956 level.

"Dielmoth" for Woollen Goods

Developed by Shell Chemical Co. to give protection against moths to woollen goods, "Dielmoth" has been used for some time by carpet manufacturers but now its application has been extended to cover all articles which contain wool or other keratinous material. These include piece goods, blankets, knitwear, underwear, knitting yarns and baby wools as well as furnishing fabrics of all types. Application involves little or no extra processing. It is recommended that 0·1% by weight of "Dielmoth" should be applied on the weight of the textile material to be treated. The "Dielmoth" is usually introduced directly into an acid dyebath where it readily exhausts itself on to the wool together with the dyestuffs.



A battery of the latest electronically controlled warping machines recently installed by Courtaulds Ltd., at Wolverhampton. These highly efficient, streamlined machines are manufactured by Crowther Ltd., Britannia Works, Thurmaston, Leicester.



A.C. PERIGRIP BRAKES by METROVICK

Metrovick Perigrip brakes are the outcome of extensive investigation into the mechanical, magnetic and electrical characteristics of brakes. They are exceptionally simple to adjust and dismantle and they are invaluable for use with cranes, hoists, haulages, rolling mill auxiliaries, machine tools, certain textile drives and indeed for any drive where POSITIVE STOPPING is required.

MOST SIZES NOW AVAILABLE FROM STOCK OR ON REDUCED DELIVERY TIMES FOR THE POPULAR VOLTAGE RANGES.

IF REQUIRED URGENTLY RING TRAFFORD PARK 2431 — Extension 1310.

METROPOLITAN-VICKERS

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JK/201

RECENT TEXTILE PATENTS

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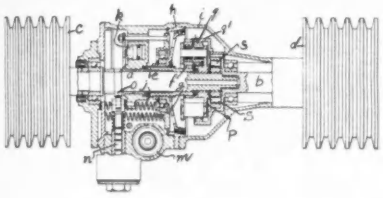
773,587 Variable Speed Mechanisms

AUTO TRANSMISSIONS LTD., and CALICO PRINTERS' ASSOCIATION LTD., *of St. James' Buildings, Oxford Street, Manchester* 1.

A change speed mechanism for driving a ring spinning or twisting frame. An input shaft *a* and an output shaft *b* are provided with a driving pulley *c* and a driven pulley *d*. On the input shaft is mounted a sleeve *e* on which is formed a sun pinion *f* forming part of a two-speed epicyclic mechanism. In spline connection with the sleeve is a slidable friction clutch *g* adapted to co-operate with a fixed member *h* formed on the housing *i*. The slidable clutch is operable in the direction for releasing it from the fixed member by a spring *j*. Hydraulic means are provided for moving

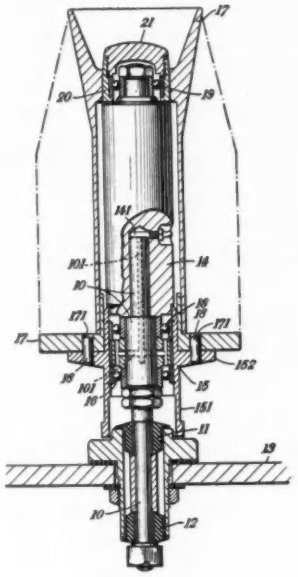


the clutch into engagement with the fixed member. The means *k* is supplied with liquid from an accumulator *m* which is supplied by a pump *n* actuated by a cam *o* on the input shaft. On the input shaft is secured a planet pinion carrier *p* provided with twin planet pinions *q* of different diameters, the pinion *f* being engaged with the planet pinions of larger diameter, and on the output shaft is formed a toothed annulus q^1 which engages the smaller planet pinions. Provided between the input shaft and the annulus on the output shaft is a unidirectional friction clutch consisting in part of rollers *s* co-operating with cam-shaped surfaces. When the slidable clutch is engaged with the housing, the output shaft is rotated at a higher speed than the input shaft, and when the member is disengaged from the housing, the input and output shafts are interconnected by the unidirectional clutch.

773,614 Spindles for Spinning and like Machines

T.M.M. (RESEARCH) LTD., *Hartford Works, Oldham.*

A twisting unit comprises a dead blade 10 supported by resilient mountings 11, 12 in the spindle rail 13 and a stationary pillar 14 spigoted upon the upper end of the dead blade. The lower component of the bobbin carrier consists of a short sleeve 15 supported by ball bearings 16 upon the dead blade and extending to form a wharve 151. A flange 152 on sleeve 15 provides a support for a bobbin 17, and pegs 18 are arranged to be received in holes 171 in the bobbin so that motion of sleeve 15 is positively transmitted to the latter. Pillar 14 has a ball-bearing 19 upon which is mounted a second sleeve 20, which constitutes the other component of the bobbin

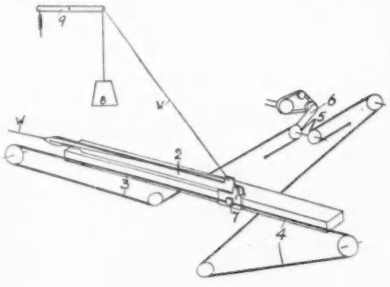


carrier and over which the bore of the bobbin is fitted. The lower bearing may be lubricated, without stopping the spindle through passages 141, 101. Access to the upper bearing 19 for lubrication may be provided by a loose cap 21 fitted in the top of the bobbin carrier sleeve 20.

774,021 Moquette etc. Looms

I. S. PORTER, *Hudroyd House, Genn Lane, Barnsley.*

An epicyclic motion for operating the weft inserting needle in a loom in which the weft is supplied from a stationary supply package. The slide 1 carrying the weft inserting needle 2 is operated by the cords 3 and 4 which pass round the pulley



5, carried by the driving arm 6 which receives its movement from an epicyclic gear. The ends of the cords are attached at the point 7 to the slide. The weft *w* is supplied to the needle from the stationary weft carrier 8 through the tensioning device 9.

774,060 Removing Selvedge Threads

A. SAURER LTD., *Arbon, Switzerland.*

A device for the removal of the thread remaining between the selvedge and the exhausted shuttle during the exchange of bobbin. A mechanical gripping device grips the end of the thread in the race, the gripping device being fixed to a lever and capable of being swung into the race, and is made in the shape of pincers. Only the lower leg is moveable, and enters a recess at the base of the shuttle box during the pivoting motion of the pincers, with the pincers in open position. The thread is lifted off the race board as the pincers close, and pushed against the fixed upper leg of the pincers at some distance from the race.

774,183 Drawframe Drafting Rollers

LINEN INDUSTRY RESEARCH ASSOCIATION, *Research Institute. Lambeg, Antrim, N. Ireland.*

A drawing frame in which one of the pressing rollers is covered with a compressible and resilient material and a member is provided to lead off the sliver from the resilient roller at a position which is beyond the position of the deformation of the surface of the roller. The sliver will thus remain in contact with the surface of the roller for a distance which is greater than the length of the peripheral surface of the roller over which distortion is formed at the nip in the compressible and resilient material.

774,343 Ringframe Builder Motion

BREMATEX, 66 *Boulevard Antee, Tangiers.*

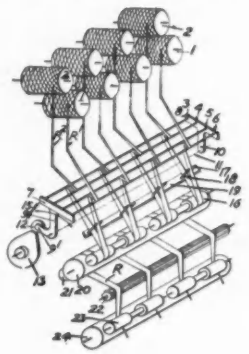
A ring frame has a ring rail actuated by a driving chain wound on a chain drum mounted on a carriage having a reciprocating motion imparted to it by a driving cam. This reciprocating motion produces through a pawl and ratchet and for every reciprocation of the carriage, an intermittent rotation of a part mounted on the carriage, This part can be coupled at will, either with means for automatically operating a variable ratio transmission device whereby the amplitude of reciprocation of the carriage is automatically varied or with the chain drum in order to impart to it an intermittent angular displacement always in the same direction for every reciprocation of the carriage.

774,360 Producing Blended Slivers

SOCIETE DE CONSTRUCTIONS MECANIQUES DE STAINS, 81-95 *Av. Aristide-Briand, Stains (Seine), France.*

Apparatus for producing blended slivers. A four-spindle spinning frame has four lower bobbins 1 and four upper bobbins 2,

and tows R_1, R_2 of continuous filaments are drawn from the bobbins. respectively Four parallel polished bars 3, 4, 5 and 6 are mounted in end plates 7, 8, the end plate 7 being mounted on a bell crank lever 9, the end plate 8 being mounted on a lever 10, and the levers 9, 10 are mounted on a common pivot pin 11. Portion 9^1 of lever 9 carries a roller 12 which bears against a cam 13. The assembly comprising the levers 9, 10, plates 7, 8 and the bars 3–6 is attached to a spring 15 which urges the



roller 12 towards the cam 13. Each tow passes in the form of a Z over the bars and the tows converge towards a common guide roller 16, being guided to the roller by two fingers 17, 18 mounted on board 19. The assembly imparts a tension to each of the tows while the rocking motion of the assembly results in a spreading of the filaments in each of the tows, and the tows of each pair are exactly superimposed on each other on the guide roller. Each double tow R then passes over the two feed rollers 20, 21. The rollers 20 are so disposed that each double tow, in travelling around its roller is turned through an angle of about 180°. Each tow is then directed to a rotating prism 22 having pronounced non-cutting edges and then to drawing rollers 23, 24. These rollers have a considerably higher speed than the rollers 20, 21 and thus effect the breaking of the double tows in co-operation with the prism.

774,366 Comminuting and Separating Fibres

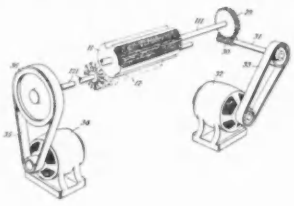
ALFRED BAYETTO, 17 *Boulevard de Belgique, Monaco.*

A machine for cumminuting material and separating the fibres out of fibrous material, comprising two co-operating sets of cutters of which, one set is rigid with the inner wall of a housing while the other set is rigid with an independent rotatable member to form a system moving inside the housing under the action of a spring to urge the cutter sets into engagement. The movable member is formed by a vertical shaft and adapted to move slightly in a vertical direction, while the distances separating the co-operating cutters of both sets decreases from its feed end towards its outlet end.

774,909 Comber Cylinder and Brush Drive

T.M.M. (RESEARCH) LTD., *Hartford Works, Oldham.*

A driving arrangement for the cylinder and the cylinder brush on a combing machine. The cylinder 11, which is mounted on shaft 111, is driven through worm-wheel 29 and worm 30 by a countershaft 31 which is driven by a motor 32 through a belt 33. The brush 12, is driven from a separate motor 34 through a belt 35 which co-operates with a heavy pulley 36 which is mounted on the brush-shaft 121.

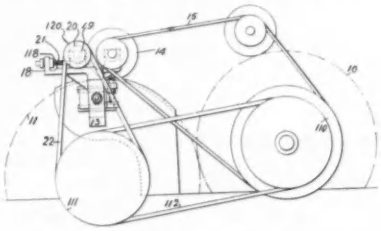


The two-speed drive for the cylinder which may be attained by the conventional rheostat or through a suitable mechanical variable-speed device in the drive between motor 32 and shaft 111, enables the cylinder to be driven at a low speed when commencing operations, or when piercing, until the lap piecing reaches the detaching rollers after which full driving speed may be resumed for normal running.

775,123 Roller-Grinding Attachments on Cards

T.M.M. (RESEARCH) LTD., *Hartford Works, Oldham.*

Describes a carding machine having auxiliary roller-supporting brackets. The doffer 11, is driven for grinding purposes from the shaft of swift 10 through a pulley 110, a belt 12 and a pulley 111. For grinding the doffer there are conventional bearing-brackets 13 supporting a grinding roller 14, which is rotated by a belt 15. The brackets 13 have off-set arms 18 including slide-faces 118 upon which are mounted auxiliary bearing-brackets 19 in



which are supported the shaft of a worker (stripper) 20. Setscrews 21 are provided for adjusting the brackets so that the worker (or stripper) may be set correctly with the grinding roller whilst being maintained clear of the doffer with which the grinding roller is being used. A belt 22 connecting the doffer pulley 111 with a temporary pulley 120 on the worker provides driving motion for the latter whilst it is being ground. By these means it is possible to avoid using a separate grinding machine for the workers and strippers.

775,521 Card Rubbing Aprons

PIRELLI SOCIETA PER AZIONI, 94 *Viale Abruzzi, Milan, Italy.*

Describes an improved card rubbing apron which has a much longer useful life than the conventional apron. The apron is composed of rubber and has its working surface incised without removal of material with deep, closely spaced cuts. These cuts subdivide the surface layer of the apron into a corresponding number of juxtaposed elementary portions which are bendable by the drag of the rovings as the latter pass between the aprons, with resulting channelling of the surface along the lines of the cuts.

775,709 Pressure Mechanism in Drafting Heads

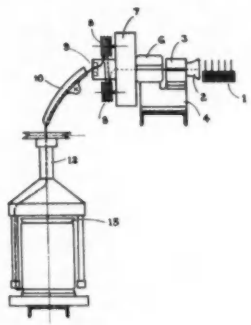
FAIRBAIRN LAWSON COMBE BARBOUR LTD., *Wellington Foundry, Leeds* 1.

A drafting head for a spinning frame comprises a bar movable in a vertical plane, with a set of upper rollers mounted on it, one or more of which may be adjustable along the length of the bar. An arm co-operates with the bar, adjustable springs being located between the bar and the arm, a spring pressure indicator indicates the pressure applied by the spring to the bar. The adjustable springs consist of one or more flat or bowed springs extending between the arm and the bar and applying pressure on the latter, the point of application of the pressure being adjustable.

775,787 Spinning Hard Fibres

FAIRBAIRN LAWSON COMBE BARBOUR LTD., *Wellington Foundry, Leeds* 1.

Frames to spin hard fibred materials such as sisal and manila, with means for improving the spinning. The arrangement consists of a pinned faller bed 1 on which fibres are combed and drafted to form sliver. The sliver enters a conductor 2 which shapes the sliver to a circular section, after which it enters a die 3. The

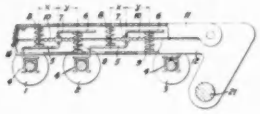


die is mounted on a bracket 4 which preferably carries a bearing 6 for a rotary gear box 7 of epicyclic type, the box bearing haul pulleys 8. The sliver after leaving the die is carried through the bearing and gear box and then round the haul pulleys, twist being imparted to the fibres between the pulleys and the die. The yarn is led from the pulleys through an eyelet 9 on to a conductor 10 which gradually changes its travel from horizontal to vertical. After leaving the conductor the yarn traverses the shaft 12 of a flyer and descends one of the arms of the flyer to be wound on the bobbin 15.

776,030 Drawframe Drafting Heads

VEB SPINNEREIMASCHINENBAU KARL-MARX-STADT, 27 *Altchemnitzer Strasse, Karl-Marx-Stadt, Germany.*

A loading arrangement for the rollers of drawing frames. The upper rollers, 1, 2, 3 are carried by saddles 4. For adjustment, the saddles of rollers 1 and 2 are mounted on double levers 5, 6, provided with journals 7. Compression springs 8

act on the front arms 5 of these double levers, and the rear arms 6 are acted on from below by compression springs 9. Springs 8, 9 are mounted so as to be stationary, while the double levers 5, 6 are displaceable and the carrying arm has for this purpose a number of notches 10. The distance x between the spring 8 and the journal 7 is exactly equal to the distance y between the spring 9 and the journal. In the case of the roller 2 these distances x, y are of different lengths, owing to the fact that this double lever 5, 6 is supported

in the third notch from the front. The carrier arm is constructed as a hollow body, in which the double levers are mounted. The upper part of this carrier arm carries the springs 8 while the springs 9 are disposed in the bottom part of the carrier arm. The carrier arm consists of an upper part 11 and lower part 12 which can be detached from one another. At the point of contact between the upper and lower parts are provided the notches 10. By means of a spring catch 14 the upper part is secured to the lower part 12 in operative position.

776,379 Improved Woven Pile Fabric

WILLIAM HILL (KIDDERMINSTER) LTD., *Worcester Road, Kidderminster.*

A pile fabric having an Axminster weave in which the security of the tufts and the binding of the backing is improved. The method of manufacturing on a split shot spool Axminster loom consists in feeding to the fabric two stuffer warps, one of which is fed through a slot in a heald wire incorporating an eye through which the one chain thread is fed to the fabric. The other warp is fed through a slot in a heald wire incorporating an eye through which the other chain thread is fed to the fabric. The two stuffer warps are thus caused to alternate with one another in passing over and under alternate pairs of lower weft threads of the fabric.

776,477 Carding Synthetic Fibres

BADISCHE ANALIN- & SODA-FABRIK AKTIENGESELLSCHAFT, *Ludwigshafen/Rhein, Germany.*

The carding of fully synthetic fibres is often impossible because these fibres in general are too soft and have too low a bundle elasticity. It is now found that these detrimental properties are attributable to the fact that the fibres used for carding have had too great a water content and that the difficulties can be obviated by using for carding synthetic fibres which are in a dry condition. In one example, a polyamide fibre is dried as completely as possible in an air-conditioning room and supplied to the opener. The lap produced is stored in a room with a relative humidity of about 30%. The lap is then supplied to the carding engine which is enclosed in an airtight manner. Since conveyance from the room to the carding engine occupies only a few minutes, only trivial influence on the outer layer of the lap can occur because the synthetic fibres absorb moisture only slowly. If it is desired to protect it from this moisture, the lap can be conveyed in plastic sacks.

776,549 Improved Condenser Card

REDSHAW AND COMPANY LTD., *Paragon Works, Lomax Street, Rochdale.*

A method of condensing in a woollen carding machine comprises stripping slivers of half the width of the sliver which it is desired to present to the rubbers from two successive positions around a swift roller, and then uniting each of these half width slivers stripped from one of the positions, with one of the half width slivers stripped from the other position. A condenser for carrying out the method comprises two doffer rollers co-operating with a swift roller, each doffer roller being of the ring type, the rings of one doffer being staggered relatively to the rings of the other doffer. A stripper roller co-operates with the two doffer rollers, the stripper also being of the ring type, its rings being of twice the width of the rings of the doffers and is disposed so that each ring on the stripper strips material from one ring on each doffer roller.

776,563 Improved Hank Poles for Dyeing

FREEMAN TAYLOR MACHINES LTD., *Necton Street Works, Syston, Leicester.*

In assembling hank poles across the width of hank cages of dyeing machines, each pole is made of a length slightly exceeding the width of the cage, and is mounted in position by slipping it through apertures in the opposite sides of the cage. It is found that the material festooned on the poles is frequently caught and trapped in the clearance between the pole and this hole and is held here during dyeing. To avoid this, and provide for a more ready and positive location of a hank pole across the cage, the pole is made of telescopic form the telescopic parts being spring urged outwards into the extended condition of the pole. The pole has tapered ends for close interfitting into the receiving apertures in the opposite walls of the cage.

776,622 Self Threading Shuttles

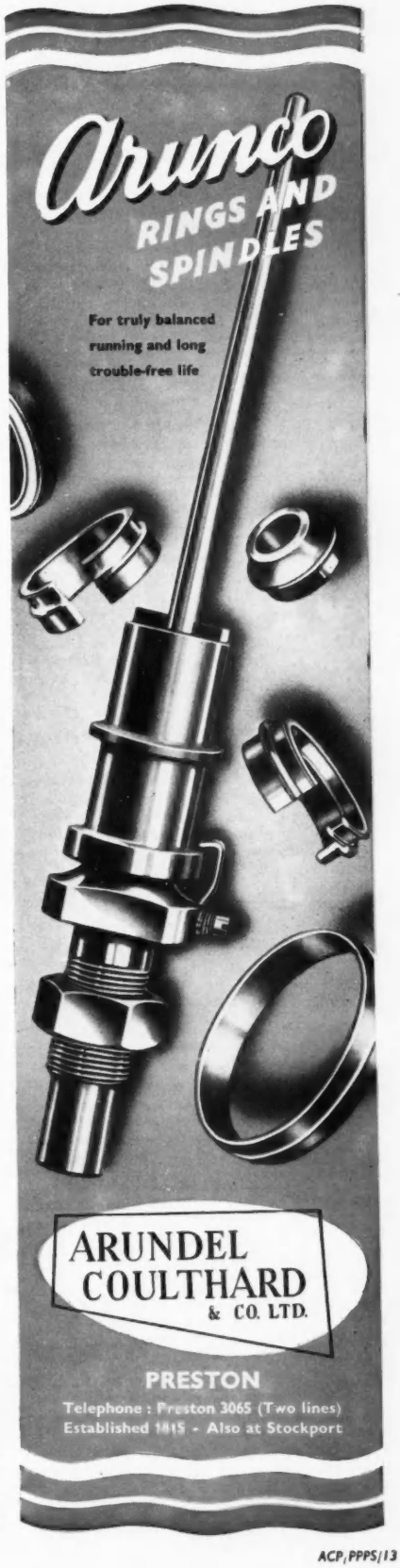
W. CLEGG, 248*a Market Street, Whitworth, Rochdale.*

Improved self threading attachments applicable to both right and left handed shuttles. The attachment comprises a base member and a pair of side and top members the pair of side and top members forming a T-shape in cross section. The side members are each formed with an extension to provide an eye communicating with a slot in the side of the shuttle nose.

777,752 Elimination of Dropped Ends on Quick Traverse Winding Machines

MASCHINENFABRIK SCHWEITER, *Horgen, Switzerland.*

A device for controlling the laying of the thread on quick traverse winding frames. The machine has a tiltable bobbin support and means to tilt the support with respect to a thread-guiding drum as the thread is traversed backwards and forwards. The support is also associated with means for stopping the machine, so that the support is additionally displaced to shift the point of reversal of the thread on the bobbin towards its narrow end upon stopping of the machine, to avoid dropped ends.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Situations Vacant

QUALIFIED TECHNOLOGIST required to undertake DEVELOPMENT work. Candidates must have had practical experience of cotton spinning and be of at least A.T.I. standard. Experience of research work useful. Preferred age 25 to 35. Salary according to qualifications and experience. This is a new post. Apply with full information to Technical Manager, Platt Bros. and Co. Limited, Hartford Works, Oldham.

Machinery, Plant, Accessories For Sale

BRUGGER Pirn Winders. 24 Spindles Brugger fully Automatic Pirn Winders now surplus to our requirements and available for immediate delivery. New in 1950. Offers to:—Talbot Spinning and Weaving Co. Ltd., Talbot Mill, Chorley.

ONE Asa Lees 1950 Woollen Mule, only used three months, complete in every respect, boxed for despatch. No reasonable offer refused, full particulars: Boucher and Co. Ltd., Pike Mills, Kidderminster.

FOR SALE. Approximately 3,500 second-hand varnished wooden winding barrels 6⅞ ins. long x 1⅛ ins. o.d. x ¾ ins. bore. Samples on request. Offers invited by British Belting and Asbestos Ltd., Scandinavia Mills, Cleckheaton, Yorks.

7—7/4 wide and 2—8/4 Wide Face to Face Plain Schonherr Looms, 1—8/4 wide and 1—4/4 Wide Plain, Face to Face Hall Looms for immediate disposal, complete with some spares and accessories, apply Boucher and Co. Ltd., Kidderminster 4711.

CANE SKIPS. Strong all cane lidded Hampers, hide bound—hardwood runners, splendid job, as new, half price or less, depending on quantity. Size 22″×20″ ×21″ inside—rectangular. Pattison, 218 Siddalls, Derby. Phone 45249.

FULL Steam in five minutes with B & A Electrode Boilers, used by British industries for over 25 years. No boilerhouse, no flue, no attendant needed. The most compact and convenient steam users available, can go beside machines raising the steam. Write for Leaflet 220, Bastian & Allen Ltd., Ferndale Terrace, Harrow, Middlesex.

MANUFACTURERS of sectional water storage tanks, 50 to 40,000 gallons capacity. Sewage and Effluent Pumps. G. L. Murphy Limited, Imperial Works, Menston, Nr. Leeds.

TO be Sold. 2 pick-and-pick Tapestry looms, "Pilling," 62-in. in Reed Space, 4 boxes each side, weft stop motion and motors, with 2 Jacquards, 2×1,320 "Dracups," fairly new; 2 pick-and-pick Dobby Looms, 62-in. in Reed Space, Robert Hall; 1 Piano Card Cutting Machine; 1 Treadle-operated Card Repeating Machine. Box T.W. 80, "Textile Manufacturer," 30 King Street West, Manchester 3.

IN Sweden, 8 Platts' MS.2 Roving Frames, 1951, 142 spindles each, Monocoupe oiling, 6-in. gauge, 8 in.× 4½-in. bobbins. Little used. Excellent condition. Box T.W.81, "Textile Manufacturer," 30 King Street West, Manchester 3.

Machinery, Plant and Accessories Wanted

JACQUARD Pattern Loom required 400 hooks, 4 boxes each side, Hattersley or Dobcross. Apply Parkland Manufacturing Co. Ltd., Albion Mills, Greengates, Bradford.

Patents for Sale or Licence

THE Proprietors of Patent No. 729975 for "Improvements in or relating to Rollers for use on Textile Spinning Machines" desire to secure commercial exploitation by Licence or otherwise in the United Kingdom. Replies to Haseltine Lake and Co. 28 Southampton Buildings, Chancery Lane, London, W.C.2.

THE Proprietors of British Patent No. 694250 are prepared to sell the patent or to license British manufacturers to work thereunder. It relates to "Improvements in or relating to Machines for Grinding the Flats of Carding Engines." Address: Boult, Wade and Tennant, 112 Hatton Garden, London, E.C.1.

THE Proprietor of British Patent No. 712187 is prepared to sell the patent or to license British manufacturers to work thereunder. It relates to an "Improved Process for the Manufacture of Yarns of Stiff Hair or Filaments of Synthetic Material unfit for Spinning. Address: Boult, Wade and Tennant, 112 Hatton Garden, London, E.C.1.

THE Proprietors of British Patents Nos. 699633, 699657 and 717646 are prepared to sell the patents or to license British manufacturers to work thereunder. They relate to "Improvements in or relating to Pile Fabrics and Method of Manufacturing same," "Improvements in or relating to a Machine for Manufacturing a Reversible Pile Fabric" and "Improved Method of and Apparatus for the Production of Reversible Pile Fabrics" respectively. Address: Boult, Wade and Tennant, 112 Hatton Garden, London, E.C.1.

THE Proprietors of British Patent No. 724789 dated the 30th January, 1953, relating to "Bobbin Replenishing Mechanism for Winding Machines" are desirous of entering into an arrangement by way of a License or otherwise in reasonable terms for the purpose of exploiting the above Patent and ensuring its practical working in Great Britain. All enquiries to be addressed to:—Heron Rogers and Co., Bridge House, 181 Queen Victoria Street, London, E.C.4.

Back Numbers Wanted

THE following back numbers of "THE TEXTILE MANUFACTURER" are urgently wanted:—
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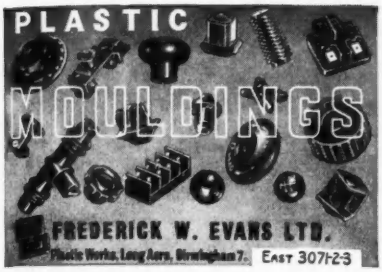

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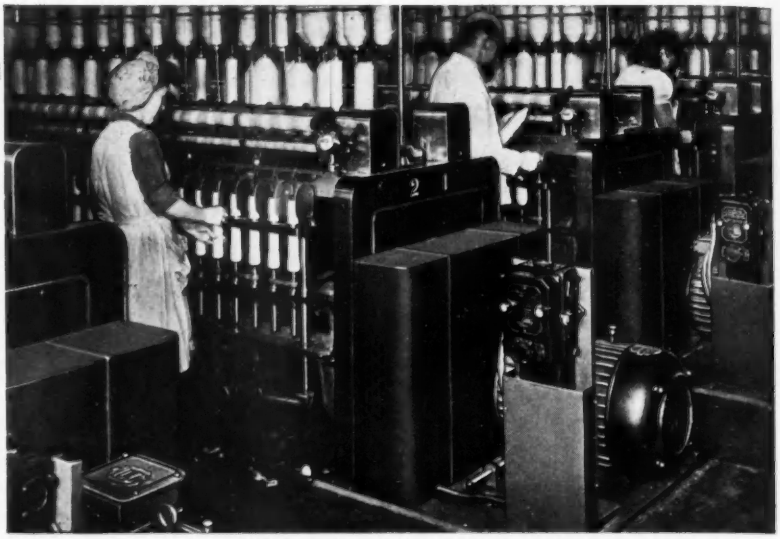

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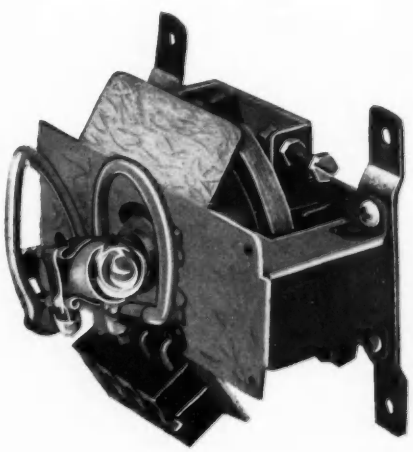

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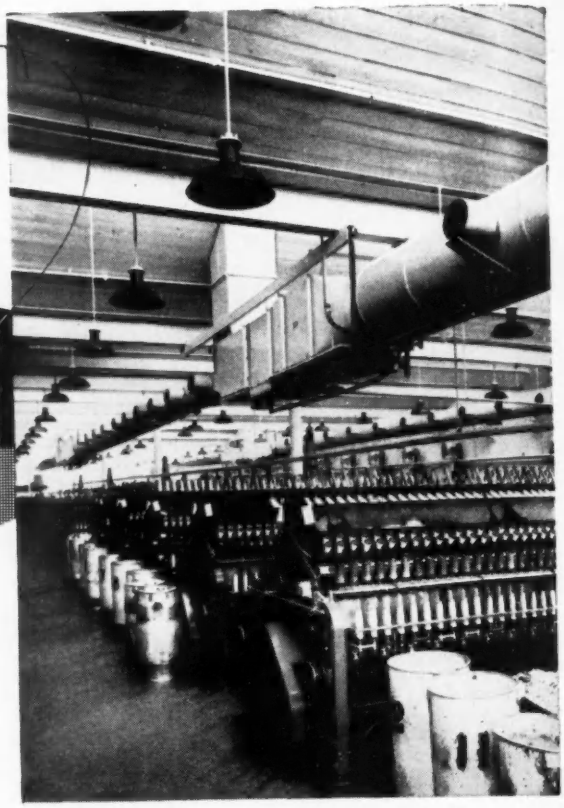

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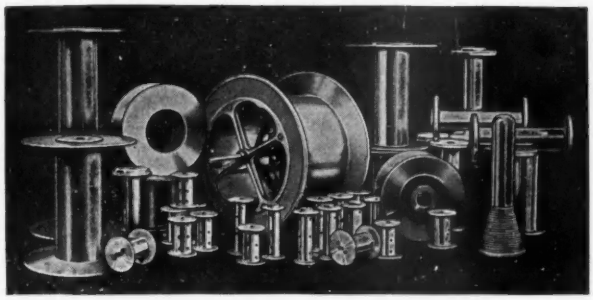

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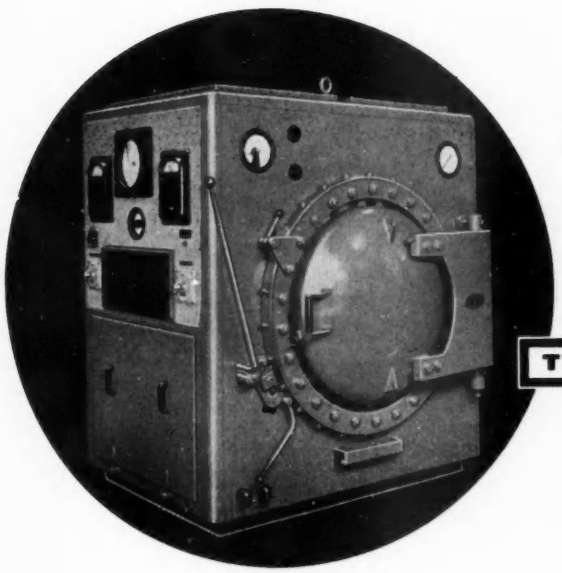

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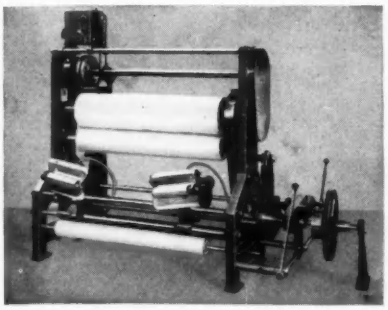

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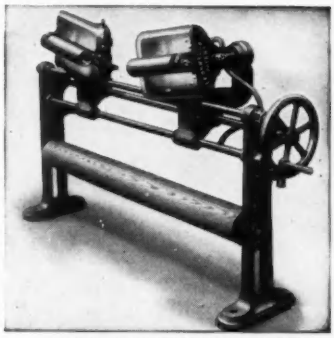

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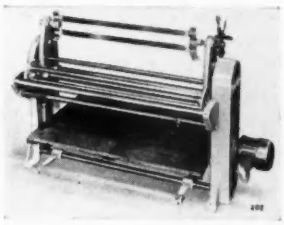

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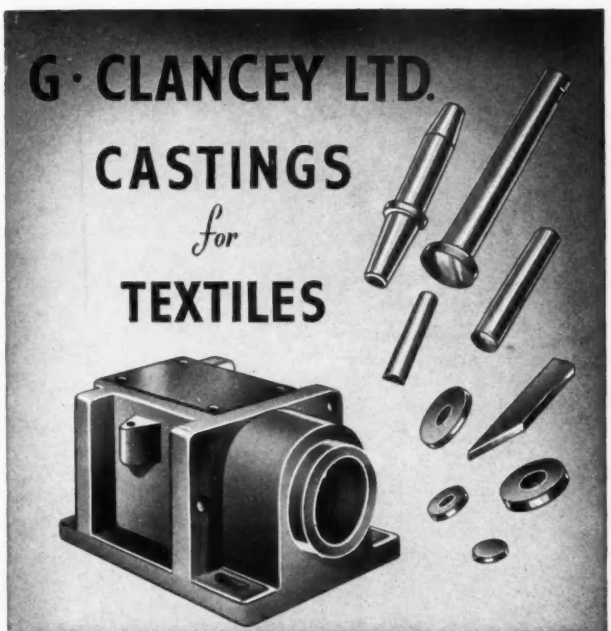

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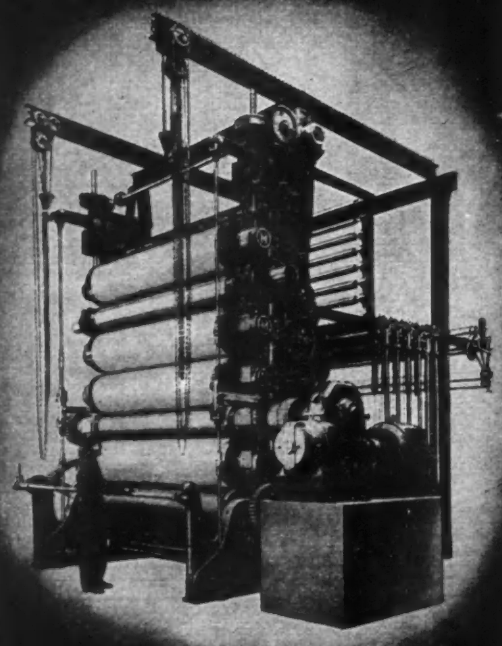

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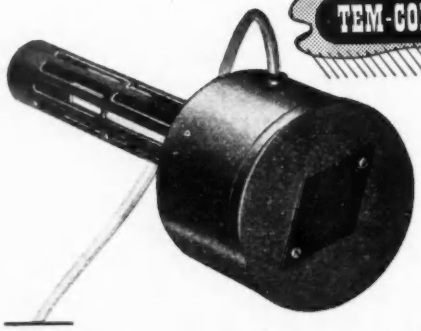

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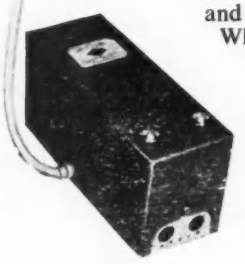

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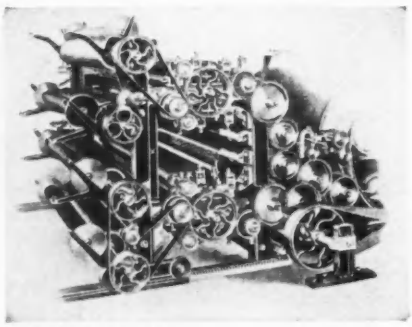

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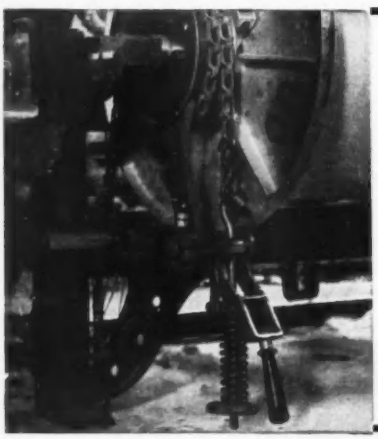

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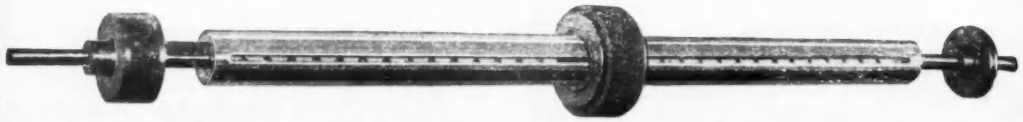

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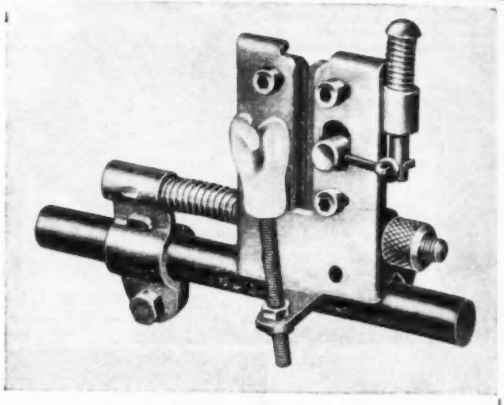

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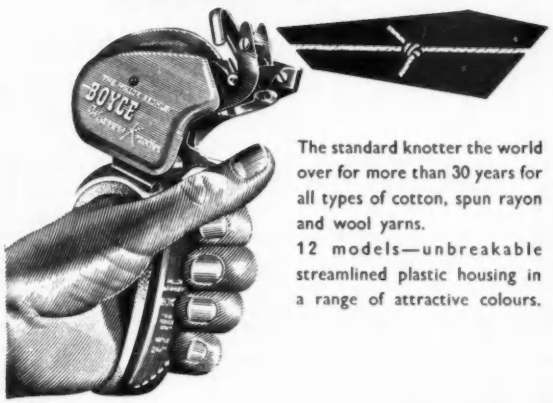

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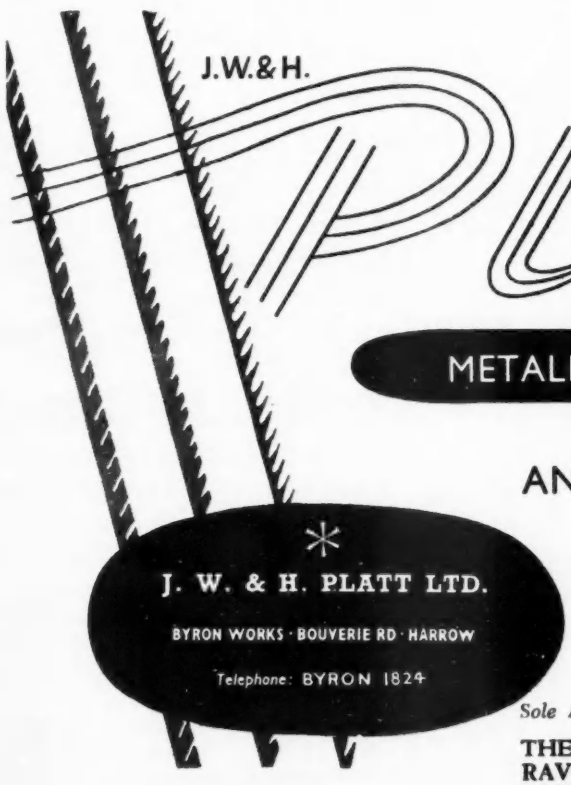

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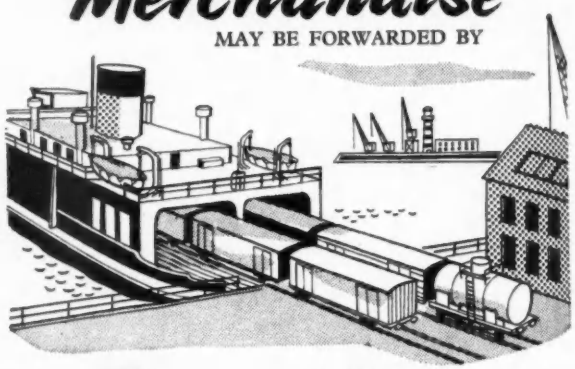

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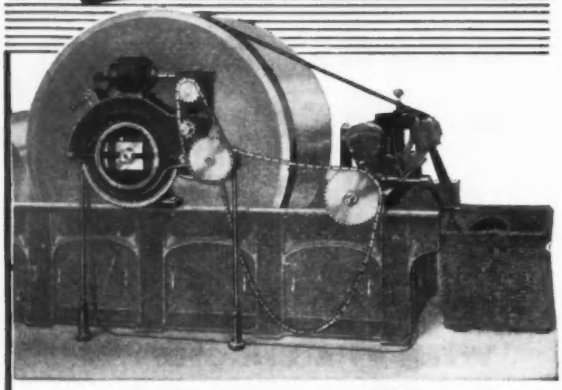

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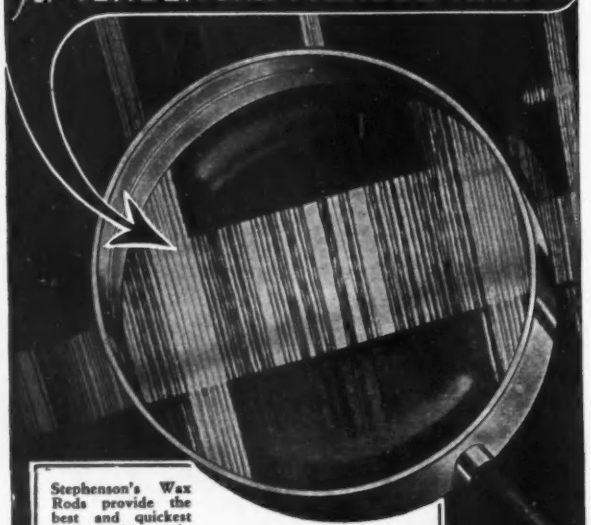

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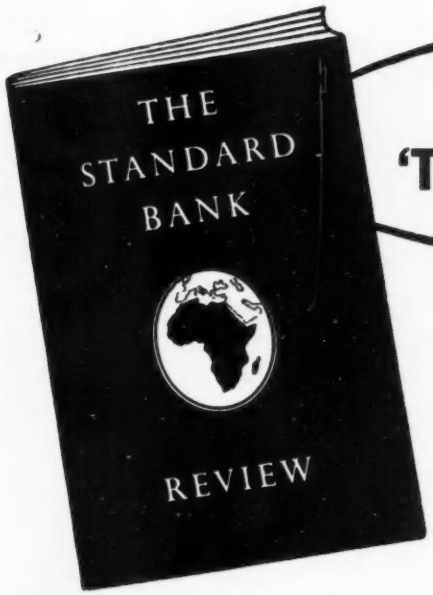

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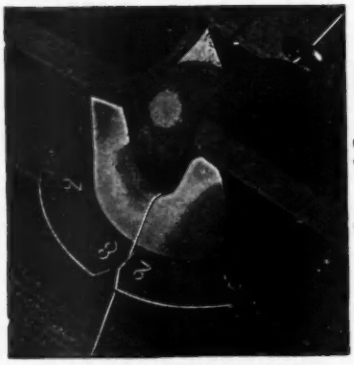

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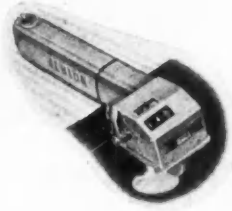

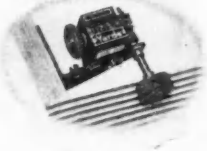

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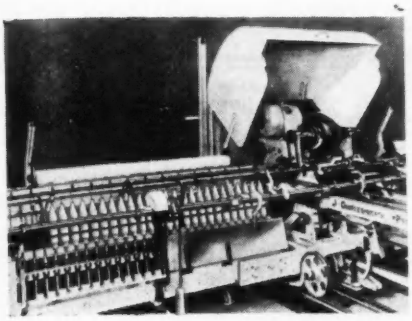

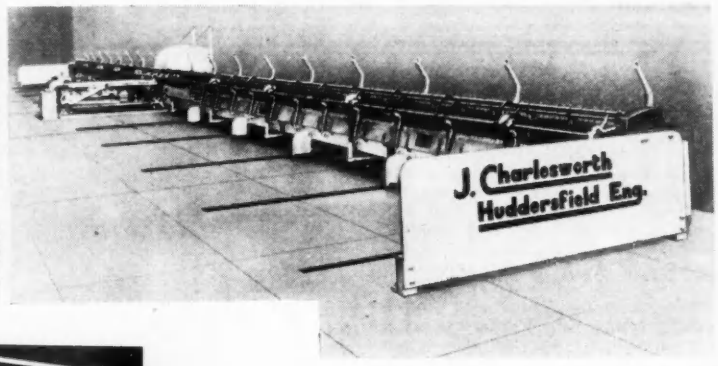

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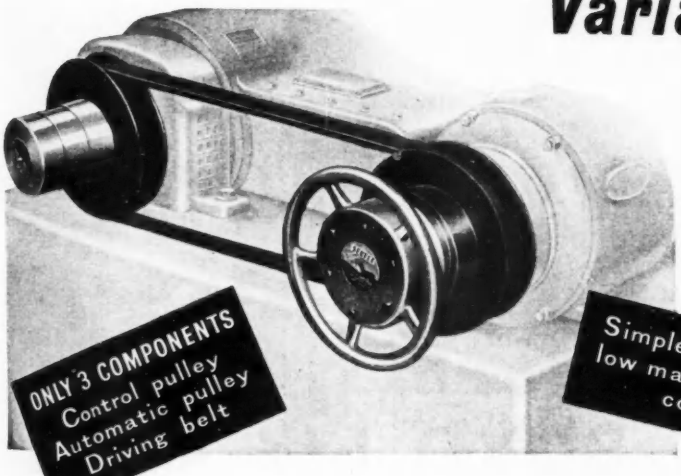

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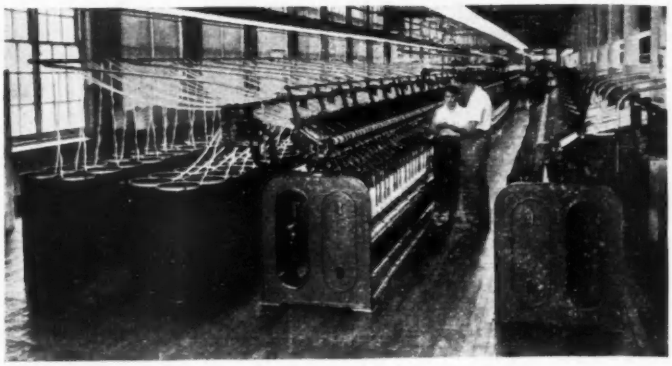

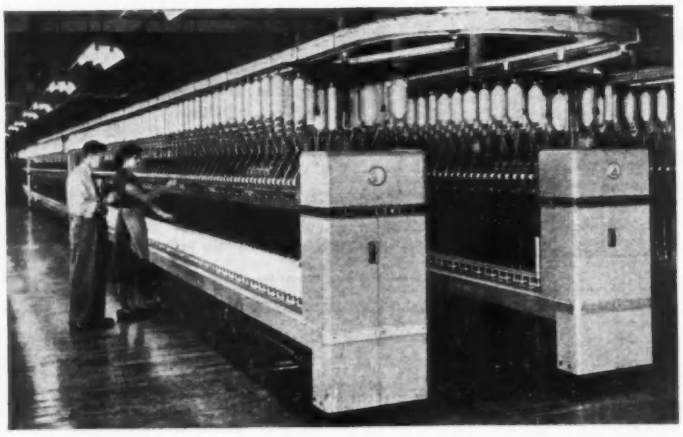

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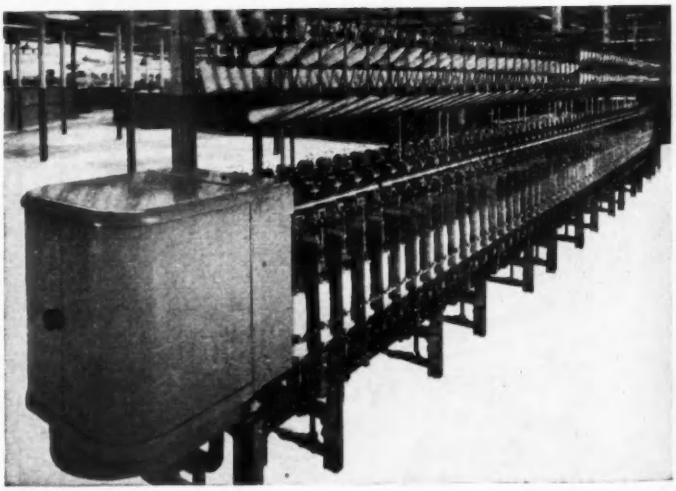

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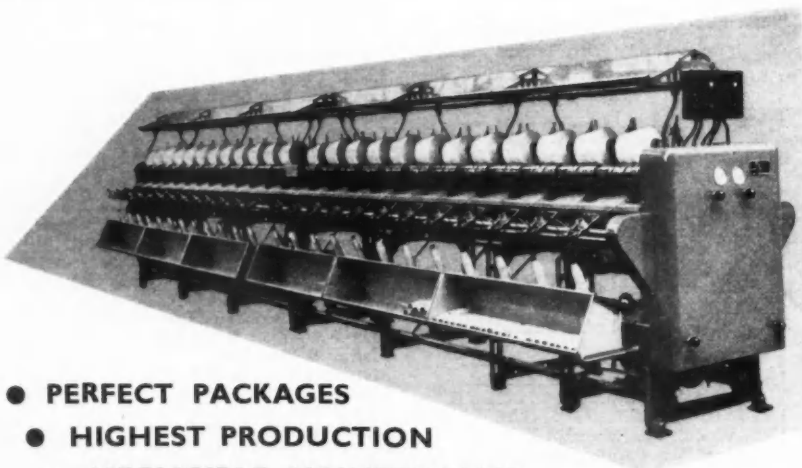

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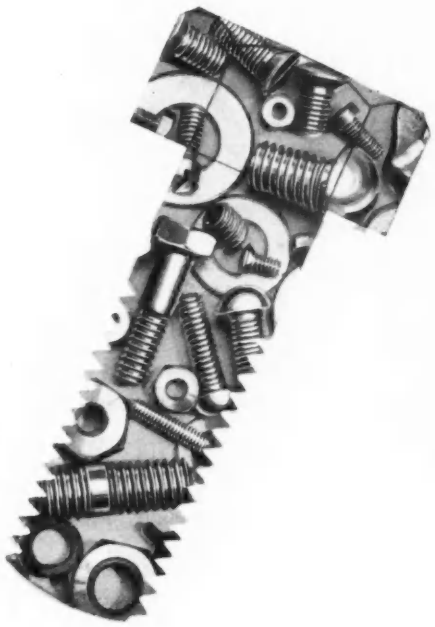

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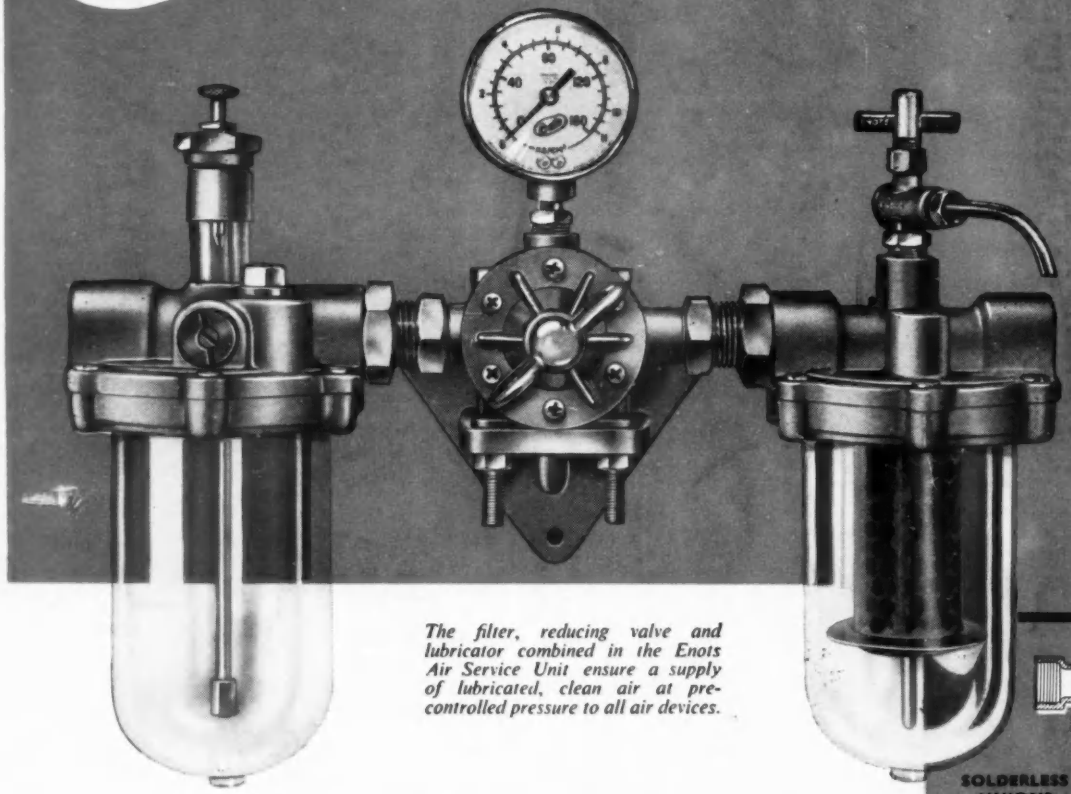

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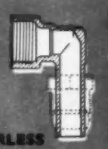

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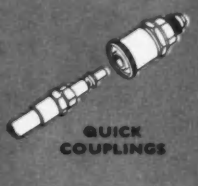

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